



SEQUENCE LISTING

<110> Osteryoung, Katherine W.
Vitha, Stanislav
Koksharova, Olga A.
Gao, Hongo

<120> Plastid Division and Related Genes and Proteins, and Methods of Use

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<141> 2003-06-20

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Met Arg Leu Glu Gln Glu Pro Cys Ser Pro Phe Ser Ala Lys Glu Ile
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| Thr | Pro | Gly | Leu | Ile | Ala | Pro | Ala | Pro | Gly | Leu | Lys | Asn | Arg | Ala | Leu |
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| Gln | Val | Gln | Ala | Arg | Ala | Val | Glu | Ala | Leu | Val | Arg | Ala | Lys | Met | Gln |
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| His | Lys | Glu | Phe | Ile | Ile | Leu | Cys | Leu | Glu | Asp | Ser | Ser | Asp | Trp | Ser |
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| Ile | Ala | Thr | Thr | Arg | Arg | Ile | Val | Met | Gln | Val | Asp | Pro | Glu | Leu | Ser |
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| Leu | Asp | Ser | Ser | Leu | Leu | Gly | Asp | Ser | Pro | Phe | Phe | Thr | Ser | Val | Pro |
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| Glu | Phe | Lys | Gln | Ala | Val | Ser | Leu | Arg | Glu | Met | Glu | Asp | Ile | Ala | Ser |
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| Leu | Glu | Lys | Lys | Leu | Gly | Arg | Leu | Leu | Thr | Lys | Gln | Glu | Lys | Ser | Arg |
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Leu Phe Leu Thr Lys Leu Ser Leu Leu Leu Lys Gly Thr Val Val Ala
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Pro Pro Asp Lys Phe Gly Glu Thr Leu Gln Asp Glu Arg Thr Gln Gly
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Gly Ala Phe Val Gly Thr Asp Gly Leu Gln Phe Ser His Lys Leu Ile
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Gln Asn Ala Gly Met Arg Leu Tyr Gly Gly Ala Gln Tyr His Arg Ala
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Thr Arg Glu Glu Ile Val Asn Ala Cys Gly Val Glu Asp Ile His Asp
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Gly Thr Asn Tyr Ser Arg Thr Ala Cys Val Ile Ala Val Ala Lys Ala
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Arg Glu Thr Phe Glu Pro Phe Leu His Gln Leu Gly Ala Arg Leu Leu
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His Ile Leu Lys Arg Leu Leu Pro Ile Ser Val Tyr Leu Leu Gln Lys
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Lys Cys Met Glu Asp Leu Ala Ser Thr Thr Arg Tyr Val Thr Trp Ser
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Asp Ser Ile Phe Asp Ile Thr Asn Leu Arg Gln Ser Leu Asp Gln Lys
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| attataatcc | atgtacaaga | acaagacaac | tggatttgaa | gaccatgccc | agcttgctct | 3480 |

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| aaaaacaacc | tgaagagctc | ggtttttcag | tcctggtgca | ggagcaataa | gtccagggtgt | 5460 |
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Asn Glu Leu His Ala Leu Ala Gln Glu Leu Glu Thr Pro Phe Glu Ala
 35 40 45

Pro Ala Val Leu Val Val Gly Gln Gln Thr Asp Gly Lys Ser Ala Leu
 50 55 60

Val Glu Ala Leu Met Gly Phe Gln Phe Asn His Val Gly Gly Gly Thr
 65 70 75 80

Lys Thr Arg Arg Pro Ile Thr Leu His Met Lys Tyr Asp Pro Gln Cys
 85 90 95

Gln Phe Pro Leu Cys His Leu Gly Ser Asp Asp Asp Pro Ser Val Ser
 100 105 110
 Leu Pro Lys Ser Leu Ser Gln Ile Gln Ala Tyr Ile Glu Ala Glu Asn
 115 120 125
 Met Arg Leu Glu Gln Glu Pro Cys Ser Pro Phe Ser Ala Lys Glu Ile
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 Ile Val Lys Val Gln Tyr Lys Tyr Cys Pro Asn Leu Thr Ile Ile Asp
 145 150 155 160
 Thr Pro Gly Leu Ile Ala Pro Ala Pro Gly Leu Lys Asn Arg Ala Leu
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 Gln Val Gln Ala Arg Ala Val Glu Ala Leu Val Arg Ala Lys Met Gln
 180 185 190
 His Lys Glu Phe Ile Ile Leu Cys Leu Glu Asp Ser Ser Asp Trp Ser
 195 200 205
 Ile Ala Thr Thr Arg Arg Ile Val Met Gln Val Asp Pro Glu Leu Ser
 210 215 220
 Arg Thr Ile Val Val Ser Thr Lys Leu Asp Thr Lys Ile Pro Gln Phe
 225 230 235 240
 Ser Cys Ser Ser Asp Val Glu Val Phe Leu Ser Pro Pro Ala Ser Ala
 245 250 255
 Leu Asp Ser Ser Leu Leu Gly Asp Ser Pro Phe Phe Thr Ser Val Pro
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 Ser Gly Arg Val Gly Tyr Gly Gln Asp Ser Val Tyr Lys Ser Asn Asp
 275 280 285
 Glu Phe Lys Gln Ala Val Ser Leu Arg Glu Met Glu Asp Ile Ala Ser
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 Ile Gly Ile Ser Lys Leu Arg Leu Phe Leu Glu Glu Leu Leu Trp Lys
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Arg Tyr Lys Glu Ser Val Pro Leu Ile Ile Pro Leu Leu Gly Lys Glu
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 Tyr Arg Ser Thr Val Arg Lys Leu Asp Thr Leu Ser Leu Leu Lys
 355 360 365
 Gly Thr Val Val Ala Pro Pro Asp Lys Phe Gly Glu Thr Leu Gln Asp
 370 375 380
 Glu Arg Thr Gln Gly Gly Ala Phe Val Gly Thr Asp Gly Leu Gln Phe
 385 390 395 400
 Ser His Lys Leu Ile Pro Asn Ala Gly Met Arg Leu Tyr Gly Gly Ala
 405 410 415
 Gln Tyr His Arg Ala Met Ala Glu Phe Arg Phe Leu Val Gly Ala Ile
 420 425 430
 Lys Cys Pro Pro Ile Thr Arg Glu Glu Ile Val Asn Ala Cys Gly Val
 435 440 445
 Glu Asp Ile His Asp Gly Thr Asn Tyr Ser Arg Thr Ala Cys Val Ile
 450 455 460
 Ala Val Ala Lys Ala Arg Glu Thr Phe Glu Pro Phe Leu His Gln Lys
 465 470 475 480
 Val Phe Ser Ser Ser His Phe Arg Leu Phe Cys Val Asp Ile Val Arg
 485 490 495
 Gly Glu Ala Ser Thr His Ser Gln Glu Ile Ala Ser Asn Phe Cys Ile
 500 505 510
 Ser Ser Ser Gly Arg Tyr Cys Phe Leu Trp Phe Asp Gly Glu Tyr Leu
 515 520 525
 Ser Gly His Glu Val Phe Leu Lys Arg Val Ala Ser Ala Phe Asn Ser
 530 535 540
 Phe Val Glu Ser Thr Glu Lys Ser Cys Arg Asp Lys Cys Met Glu Asp
 545 550 555 560

Leu Ala Ser Thr Thr Arg Tyr Val Thr Trp Ser Leu His Asn Lys Asn
 565 570 575

Arg Ala Gly Leu Arg Gln Phe Leu Asp Ser Phe Gly Gly Thr Glu His
 580 585 590

Asn Thr Thr Ser Gly Asn Ala Ile Gly Phe Ser Leu Pro Gln Asp Ala
 595 600 605

Leu Gly Gly Thr Thr Asp Thr Lys Ser Arg Ser Asp Val Lys Leu Ser
 610 615 620

His Leu Ala Ser Asn Ile Asp Ser Gly Ser Ser Ile Gln Thr Thr Glu
 625 630 635 640

Met Arg Leu Ala Asp Leu Leu Asp Ser Thr Leu Trp Asn Arg Lys Leu
 645 650 655

Ala Pro Ser Ser Glu Arg Ile Val Tyr Ala Leu Val Gln Gln Ile Phe
 660 665 670

Gln Gly Ile Arg Glu Tyr Phe Leu Ala Ser Ala Glu Leu Lys Phe Asn
 675 680 685

Cys Phe Leu Leu Met Pro Ile Val Asp Lys Leu Pro Ala Leu Leu Arg
 690 695 700

Glu Glu Leu Glu Asn Ala Phe Glu Asp Asp Leu Asp Ser Ile Phe Asp
 705 710 715 720

Ile Thr Asn Leu Arg Gln Ser Leu Asp Gln Lys Lys Arg Ser Thr Glu
 725 730 735

Ile Glu Leu Arg Arg Ile Lys Arg Ile Lys Glu Lys Phe Arg Val Met
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Ser Val Gln His
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Ser Lys Met Gln Ser His Ser Lys Asp Pro Ile Asn Ala Glu Ser Arg
 35 40 45

Ser Arg Phe Glu Ala Tyr Asn Arg Leu Gln Ala Ala Val Ala Phe
 50 55 60

Gly Glu Lys Leu Pro Ile Pro Glu Ile Val Ala Ile Gly Gly Gln Ser
 65 70 75 80

Asp Gly Lys Ser Ser Leu Leu Glu Ala Leu Leu Gly Phe Arg Phe Asn
 85 90 95

Val Arg Glu Val Glu Met Gly Thr Arg Arg Pro Leu Ile Leu Gln Met
 100 105 110

Val His Asp Leu Ser Ala Leu Glu Pro Arg Cys Arg Phe Gln Ile Ser
 115 120 125

Arg Ile Phe Phe Val Glu Leu Ala Ile Leu Ile Thr Asp Leu Asp Glu
 130 135 140

Asp Ser Glu Glu Tyr Gly Ser Pro Ile Val Ser Ala Thr Ala Val Ala
 145 150 155 160

Asp Val Ile Arg Ser Arg Thr Glu Ala Leu Leu Lys Lys Thr Lys Thr
 165 170 175

Ala Val Ser Pro Lys Pro Ile Val Met Arg Ala Glu Tyr Ala His Cys
 180 185 190

Pro Asn Leu Thr Ile Ile Asp Thr Pro Gly Phe Val Leu Lys Ala Lys
 195 200 205

Lys Gly Glu Pro Glu Thr Thr Pro Asp Glu Ile Leu Ser Met Val Lys
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Ser Leu Ala Ser Pro Pro His Arg Ile Leu Leu Phe Leu Gln Gln Ser
 225 230 235 240

Ser Val Glu Trp Cys Ser Ser Leu Trp Leu Asp Ala Val Arg Glu Ile
 245 250 255

Asp Ser Ser Phe Arg Arg Thr Ile Val Val Val Ser Lys Phe Asp Asn
 260 265 270

Arg Leu Lys Glu Phe Ser Asp Arg Gly Glu Val Asp Arg Tyr Leu Ser
 275 280 285

Ala Ser Gly Tyr Leu Gly Glu Asn Thr Arg Pro Tyr Phe Val Ala Leu
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Pro Lys Asp Arg Ser Thr Ile Ser Asn Asp Glu Phe Arg Arg Gln Ile
 305 310 315 320

Ser Gln Val Asp Thr Glu Val Ile Arg His Leu Arg Glu Gly Val Lys
 325 330 335

Gly Gly Phe Asp Glu Glu Lys Phe Arg Ser Cys Ile Gly Phe Gly Ser
 340 345 350

Leu Arg Asp Phe Leu Glu Ser Glu Leu Gln Lys Arg Tyr Lys Glu Ala
 355 360 365

Ala Pro Ala Thr Leu Ala Leu Leu Glu Glu Arg Cys Ser Glu Val Thr
 370 375 380

Asp Asp Met Leu Arg Met Asp Met Lys Ile Gln Ala Thr Ser Asp Val
 385 390 395 400

Ala His Leu Arg Lys Ala Ala Met Leu Tyr Thr Ala Ser Ile Ser Asn
 405 410 415

His Val Gly Ala Leu Ile Asp Gly Ala Ala Asn Pro Ala Pro Glu Gln
 420 425 430

Trp Gly Lys Thr Thr Glu Glu Glu Arg Gly Glu Ser Gly Ile Gly Ser
 435 440 445

Trp Pro Gly Val Ser Val Asp Ile Lys Pro Pro Asn Ala Val Leu Lys
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Leu Tyr Gly Gly Ala Ala Phe Glu Arg Val Ile His Glu Phe Arg Cys
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Ala Ala Tyr Ser Ile Glu Cys Pro Pro Val Ser Arg Glu Lys Val Ala
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Asn Ile Leu Leu Ala His Ala Gly Arg Gly Gly Gly Arg Gly Val Thr
 500 505 510

Glu Ala Ser Ala Glu Ile Ala Arg Thr Ala Ala Arg Ser Trp Leu Ala
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Pro Leu Leu Asp Thr Ala Cys Asp Arg Leu Ala Phe Val Leu Gly Ser
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Leu Phe Glu Ile Ala Leu Glu Arg Asn Leu Asn Gln Asn Ser Glu Tyr
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Glu Lys Lys Thr Glu Asn Met Asp Gly Tyr Val Gly Phe His Ala Ala
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Val Arg Asn Cys Tyr Ser Arg Phe Val Lys Asn Leu Ala Lys Gln Cys
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Lys Gln Leu Val Arg His His Leu Asp Ser Val Thr Ser Pro Tyr Ser
 595 600 605

Met Ala Cys Tyr Glu Asn Asn Tyr His Gln Gly Gly Ala Phe Gly Ala
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Tyr Asn Lys Phe Asn Gln Ala Ser Pro Asn Ser Phe Cys Phe Glu Leu
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Ser Asp Thr Ser Arg Asp Glu Pro Met Lys Asp Gln Glu Asn Ile Pro
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Pro Glu Lys Asn Asn Gly Gln Glu Thr Thr Pro Gly Lys Gly Gly Glu
660 665 670

Ser His Ile Thr Val Pro Glu Thr Pro Ser Pro Asp Gln Pro Cys Glu
675 680 685

Ile Val Tyr Gly Leu Val Lys Lys Glu Ile Gly Asn Gly Pro Asp Gly
690 695 700

Val Gly Ala Arg Lys Arg Met Ala Arg Met Val Gly Asn Arg Asn Ile
705 710 715 720

Glu Pro Phe Arg Val Gln Asn Gly Gly Leu Met Phe Ala Asn Ala Asp
725 730 735

Asn Gly Met Lys Ser Ser Ser Ala Tyr Ser Glu Ile Cys Ser Ser Ala
740 745 750

Ala Gln His Phe Ala Arg Ile Arg Glu Val Leu Val Glu Arg Ser Val
755 760 765

Thr Ser Thr Leu Asn Ser Gly Phe Leu Thr Pro Cys Arg Asp Arg Leu
770 775 780

Val Val Ala Leu Gly Leu Asp Leu Phe Ala Val Asn Asp Asp Lys Phe
785 790 795 800

Met Asp Met Phe Val Ala Pro Gly Ala Ile Val Val Leu Gln Asn Glu
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<212> PRT

<213> Arabidopsis thaliana

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Asp Pro Ile Asn Ala Glu Ser Arg Ser Arg Phe Glu Ala Tyr Asn Arg
35 40 45

Leu Gln Ala Ala Ala Val Ala Phe Gly Glu Lys Leu Pro Ile Pro Glu
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Asp Glu Ile Leu Ser Met Val Lys Ser Leu Ala Ser Pro Pro His Arg
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Tyr Ser Glu Ile Cys Ser Ser Ala Ala Gln His Phe Ala Arg Ile Arg
725 730 735

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Arg Cys Gln Thr His Pro Asp Gly Gln Tyr Val Cys Tyr Leu Pro Ala
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Asn His Glu Thr Gln Asn Met Asn Glu Leu Pro Glu Lys Lys Asn Ser
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Asp Glu Pro Phe Leu Met Val Ile Val Gly Glu Phe Asn Ser Gly Lys
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Val Val Pro Thr Thr Asn Glu Ile Thr Phe Leu Cys Tyr Ser Asp Leu
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Glu Ser Glu Glu Gln Gln Arg Cys Gln Thr His Pro Asp Gly Gln Tyr
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| agaacaagag aaacctggaa acaagaacca aaaaaagtgg gctttctctg catcatcatt | 300 |
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| gcaagcaaaa ctcaactatg tcaaaagtgt cacttagatt gattcttgaa tagcgagacg | 1980 |
| aagtatctgg gaaaatacgg tactgaatta acatctccgt cagatcatag gttcggattg | 2040 |
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| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 59 | |
| | cataagcttt tatgctccaa aatagtctc | 29 |
| <210> | 60 | |
| <211> | 24 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |

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|-------------------------------|----|
| <400> 60 | |
| cttgatcttg tgttctgaca tctc | 24 |
| | |
| <210> 61 | |
| <211> 27 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 61 | |
| ctaaactatt cacaaatgcc atagacg | 27 |
| | |
| <210> 62 | |
| <211> 24 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 62 | |
| agccgtcttg tcccatcatt aaag | 24 |
| | |
| <210> 63 | |
| <211> 26 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 63 | |
| gcacaaacaa acagggtaa tagtta | 26 |
| | |
| <210> 64 | |
| <211> 23 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 64 | |
| ttaaagtga gcttaagcag agg | 23 |

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|-------|----------------------------|----|
| <210> | 65 | |
| <211> | 24 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 65 | |
| | cattgtaga aagtcaacac ttg | 24 |
| <210> | 66 | |
| <211> | 23 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 66 | |
| | gcaagacata accaatgaac aag | 23 |
| <210> | 67 | |
| <211> | 22 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 67 | |
| | gacacgtatg cgtttctaag ag | 22 |
| <210> | 68 | |
| <211> | 24 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 68 | |
| | ctccaacttc aagcaaaacg gatg | 24 |
| <210> | 69 | |
| <211> | 24 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |

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|-----------------------------|----|
| <400> 69 | |
| ctctgttttt tgggctagtg atgg | 24 |
| <210> 70 | |
| <211> 22 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| <400> 70 | |
| gcatacccaa tatcctttgt gc | 22 |
| <210> 71 | |
| <211> 23 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| <400> 71 | |
| gatagtataa ccagaggttg gag | 23 |
| <210> 72 | |
| <211> 25 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| <400> 72 | |
| gaatcttctc aaactgaaat ccacc | 25 |
| <210> 73 | |
| <211> 22 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| <400> 73 | |
| tcgaaaggaa gatcggtgaa cc | 22 |

| | | |
|-------|--------------------------------|----|
| <210> | 74 | |
| <211> | 24 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 74 | |
| | gattgtgcta tggttcagga gttc | 24 |
| <210> | 75 | |
| <211> | 23 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 75 | |
| | catcagctat aacctcctca gtg | 23 |
| <210> | 76 | |
| <211> | 24 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 76 | |
| | actgactata aggacccctc aaac | 24 |
| <210> | 77 | |
| <211> | 28 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |
| <400> | 77 | |
| | gttgaccata attcatccac cactatta | 28 |
| <210> | 78 | |
| <211> | 27 | |
| <212> | DNA | |
| <213> | Artificial Sequence | |
| <220> | | |
| <223> | Synthetic | |

| | |
|----------------------------------|----|
| <400> 78 | |
| ggaattccga gtcgagttgc tttgttg | 27 |
| | |
| <210> 79 | |
| <211> 30 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 79 | |
| cgtctagagc ttacctcaaa ggtacatgga | 30 |
| | |
| <210> 80 | |
| <211> 28 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 80 | |
| cgggatccat gagtaaagga gaagaact | 28 |
| | |
| <210> 81 | |
| <211> 27 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 81 | |
| gctctagata gttcatccat gccatgt | 27 |
| | |
| <210> 82 | |
| <211> 28 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Synthetic | |
| | |
| <400> 82 | |
| ggactagtagc gatggcggaa gtatcagc | 28 |

<210> 83
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic

 <400> 83
 cgggatccgc accgaaggag ccttttagatt 30

<210> 84
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic

 <400> 84
 gactagttgg ctcaacgctt acctcaa 27

<210> 85
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic

 <400> 85
 cgggatccgc catcgtctct tacga 25

<210> 86
 <211> 61
 <212> PRT
 <213> Arabidopsis thaliana

 <400> 86

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Pro | Tyr | Lys | Thr | Leu | Lys | Ile | Arg | Pro | Asp | Ser | Ser | Glu | Tyr | Glu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Lys | Lys | Ala | Phe | Arg | Gln | Leu | Ala | Lys | Lys | Tyr | His | Pro | Asp | Val |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Arg | Gly | Ser | Asn | Cys | Gly | Val | Gln | Phe | Gln | Thr | Ile | Asn | Glu | Ala |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Asp | Ile | Val | Leu | Lys | Gln | Ile | Lys | Asn | Gln | Met | Glu |
| | 50 | | | | | 55 | | | | | 60 | |

<210> 87
 <211> 68
 <212> PRT
 <213> Phaseolus vulgaris

<400> 87

Ser Leu Tyr Asp Ile Leu Gly Ile Pro Ala Gly Ala Ser Ser Gln Glu
 1 5 10 15

Ile Lys Ala Ala Tyr Arg Arg Leu Ala Arg Val Cys His Pro Asp Val
 20 25 30

Ala Ala Ile Asp Arg Lys Asn Ser Ser Ala Asp Glu Phe Met Lys Ile
 35 40 45

His Ala Ala Tyr Ser Thr Leu Ser Asp Pro Asp Lys Arg Ala Asn Tyr
 50 55 60

Asp Arg Ser Leu
 65

<210> 88
 <211> 68
 <212> PRT
 <213> Arabidopsis thaliana

<400> 88

Ser Leu Tyr Glu Ile Leu Glu Ile Pro Val Gly Ser Thr Ser Gln Glu
 1 5 10 15

Ile Lys Ser Ala Tyr Arg Arg Leu Ala Arg Ile Cys His Pro Asp Val
 20 25 30

Ala Arg Asn Ser Arg Asp Asn Ser Ser Ala Asp Asp Phe Met Lys Ile
 35 40 45

His Ala Ala Tyr Cys Thr Leu Ser Asp Pro Glu Lys Arg Ala Val Tyr
 50 55 60

Asp Arg Arg Thr
 65

<210> 89
 <211> 63
 <212> PRT
 <213> *Mycoplasma pneumoniae*

<400> 89

Thr Leu Tyr Asp Leu Leu Glu Leu Pro Gln Thr Ala Thr Leu Gln Glu
 1 5 10 15

Ile Lys Thr Ala Tyr Lys Arg Leu Ala Lys Arg Tyr His Pro Asp Ile
 20 25 30

Asn Lys Gln Gly Ala Asp Thr Phe Val Lys Ile Asn Asn Ala Tyr Ala
 35 40 45

Val Leu Ser Asp Thr Thr Gln Lys Ala Glu Tyr Asp Ala Met Leu
 50 55 60

<210> 90
 <211> 63
 <212> PRT
 <213> *Mycoplasma genitalium*

<400> 90

Asn Leu Tyr Asp Leu Leu Glu Leu Pro Thr Thr Ala Ser Ile Lys Glu
 1 5 10 15

Ile Lys Ile Ala Tyr Lys Arg Leu Ala Lys Arg Tyr His Pro Asp Val
 20 25 30

Asn Lys Leu Gly Ser Gln Thr Phe Val Glu Ile Asn Asn Ala Tyr Ser
 35 40 45

Ile Leu Ser Asp Pro Asn Gln Lys Glu Lys Tyr Asp Ser Met Leu
 50 55 60

<210> 91
 <211> 68
 <212> PRT
 <213> *Arabidopsis thaliana*

<400> 91

Ser Phe Tyr Asp Leu Leu Gly Val Thr Glu Ser Val Thr Leu Pro Glu
1 5 10 15

Ile Lys Gln Ala Tyr Lys Gln Leu Ala Arg Lys Tyr His Pro Asp Val
20 25 30

Ser Pro Pro Asp Arg Val Glu Glu Tyr Thr Asp Arg Phe Ile Arg Val
35 40 45

Gln Glu Ala Tyr Glu Thr Leu Ser Asp Pro Arg Arg Arg Val Leu Tyr
50 55 60

Asp Arg Asp Leu
65

<210> 92

<211> 69

<212> PRT

<213> *Drosophila melanogaster*

<400> 92

Asn Cys Tyr Asp Val Leu Gly Val Thr Arg Glu Ser Ser Lys Ser Glu
1 5 10 15

Ile Gly Lys Ala Tyr Arg Gln Leu Ala Arg Arg Tyr His Pro Asp Leu
20 25 30

His Arg Gly Ala Glu Ala Lys Ala Ala Ala Glu Thr Gln Phe Lys Leu
35 40 45

Val Ala Thr Ala Tyr Glu Ile Leu Arg Asp Glu Glu Ser Arg Thr Asp
50 55 60

Tyr Asp Tyr Met Leu
65

<210> 93

<211> 70

<212> PRT

<213> *Caenorhabditis elegans*

<400> 93

Asn Cys Tyr Asp Val Leu Glu Val Asn Arg Glu Glu Phe Asp Lys Gln
1 5 10 15

Lys Leu Ala Lys Ala Tyr Arg Ala Leu Ala Arg Lys His His Pro Asp
20 25 30

Arg Val Lys Asn Lys Glu Glu Lys Leu Leu Ala Glu Glu Arg Phe Arg
35 40 45

Val Ile Ala Thr Ala Tyr Glu Thr Leu Lys Asp Asp Glu Ala Lys Thr
50 55 60

Asn Tyr Asp Tyr Tyr Leu
65 70

<210> 94

<211> 72

<212> PRT

<213> Arabidopsis thaliana

<400> 94

Ser Pro Tyr Asp Thr Leu Glu Leu Asp Arg Asn Ala Glu Glu Glu Gln
1 5 10 15

Ile Lys Val Ala Tyr Arg Arg Leu Ala Lys Phe Tyr His Pro Asp Val
20 25 30

Tyr Asp Gly Lys Gly Thr Leu Glu Glu Gly Glu Thr Ala Glu Ala Arg
35 40 45

Phe Ile Lys Ile Gln Ala Ala Tyr Glu Leu Leu Met Asp Ser Glu Lys
50 55 60

Lys Val Gln Tyr Asp Met Asp Asn
65 70

<210> 95

<211> 68

<212> PRT

<213> Schizosaccharomyces pombe

<400> 95

Lys Leu Tyr Asp Ile Leu Glu Val His Phe Glu Ala Ser Ala Glu Glu
1 5 10 15

Ile Lys Lys Ser Tyr Lys Arg Leu Ala Leu Leu His His Pro Asp Lys
20 25 30

Ala Pro Ile His Glu Lys Glu Glu Ala Ala Glu Arg Phe Arg Gly Val
35 40 45

Gln Glu Ala Tyr Asp Ile Leu Lys Asp Pro Glu Ser Arg Glu Met Tyr
50 55 60

Asp Met Tyr Gly
65

<210> 96

<211> 66

<212> PRT

<213> Unknown

<220>

<223> Synthetic

<400> 96

Asp Phe Tyr Lys Ile Leu Gly Ala Glu Pro His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Ala Phe Glu Ser Arg Ile Ala Lys Pro Pro Gln Tyr Gly
20 25 30

Tyr Ser Thr Glu Ala Leu Ala Gly Arg Arg Gln Met Leu Gln Ile Ala
35 40 45

His Asp Thr Leu Thr Asn Gln Ser Ser Arg Thr Glu Tyr Asp Arg Ala
50 55 60

Leu Ser
65

<210> 97
<211> 66
<212> PRT
<213> Oryza sativa

<400> 97

Asp Phe Tyr Lys Val Leu Gly Ala Glu Pro His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Ala Phe Glu Ala Arg Ile Ala Lys Pro Pro Gln Tyr Gly
20 25 30

Tyr Ser Thr Asp Ala Leu Val Gly Arg Arg Gln Met Leu Gln Ile Ala
35 40 45

His Asp Thr Leu Met Asn Gln Asn Ser Arg Thr Gln Tyr Asp Arg Ala
50 55 60

Leu Ser
65

<210> 98
<211> 66
<212> PRT
<213> Solanum tuberosum

<400> 98

Asp Phe Tyr Arg Val Leu Gly Ala Glu Ala His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Cys Tyr Asp Ala Arg Ile Thr Lys Pro Pro Gln Tyr Gly
20 25 30

Tyr Ser Gln Glu Ala Leu Ile Gly Arg Arg Gln Ile Leu Gln Ala Ala
35 40 45

Cys Glu Thr Leu Ala Asp Ser Thr Ser Arg Arg Glu Tyr Asn Gln Gly
50 55 60

Leu Ala
65

<210> 99
<211> 66
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 99

Asp Leu Tyr Lys Ile Leu Gly Ala Glu Thr His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Ala Tyr Glu Ala Lys Phe Ser Lys Pro Pro Gln Tyr Ala
20 25 30

Phe Ser Asn Glu Ala Leu Ile Ser Arg Arg Gln Ile Leu Gln Ala Ala
35 40 45

Cys Glu Thr Leu Ala Asp Pro Ala Ser Arg Arg Glu Tyr Asn Gln Ser
50 55 60

Leu Val
65

<210> 100
<211> 66
<212> PRT
<213> Arabidopsis thaliana

<400> 100

Asp Phe Tyr Gln Val Leu Gly Ala Gln Thr His Phe Leu Thr Asp Gly
1 5 10 15

Ile Arg Arg Ala Phe Glu Ala Arg Val Ser Lys Pro Pro Gln Phe Gly
20 25 30

Phe Ser Asp Asp Ala Leu Ile Ser Arg Arg Gln Ile Leu Gln Ala Ala
35 40 45

Cys Glu Thr Leu Ser Asn Pro Arg Ser Arg Arg Glu Tyr Asn Glu Gly
50 55 60

Leu Leu
65

<210> 101
 <211> 66
 <212> PRT
 <213> Protochlorococcus marinus MED4

<400> 101

Asp His Phe Arg Leu Ile Gly Val Ser Pro Ser Ala Thr Ser Glu Glu
 1 5 10 15

Ile Leu Arg Ala Phe Gln Leu Arg Leu Asp Lys Thr Pro Asp Glu Gly
 20 25 30

Phe Thr Tyr Glu Val Leu Thr Gln Arg Ser Glu Leu Leu Arg Leu Thr
 35 40 45

Ala Asp Leu Leu Thr Asp Pro Asp Ser Arg Arg Asp Tyr Glu Asn Leu
 50 55 60

Leu Leu
 65

<210> 102
 <211> 66
 <212> PRT
 <213> Protochlorococcus marinus MT9313

<400> 102

Asp His Phe Arg Leu Leu Gly Val Ser Pro Ser Ala Asp Ser Glu Ala
 1 5 10 15

Ile Leu Arg Ala Leu Glu Leu Arg Leu Asp Arg Cys Pro Asp Gln Gly
 20 25 30

Phe Thr His Glu Val Leu Ile Gln Arg Ala Glu Leu Leu Arg Leu Ser
 35 40 45

Ala Asp Leu Leu Thr Asp Pro Pro Arg Arg Gln Ala Tyr Glu Thr Ala
 50 55 60

Leu Leu
 65

<210> 103
 <211> 66
 <212> PRT
 <213> Synechocystis PCC6803

<400> 103

Asp His Phe Arg Leu Leu Gly Val Ser Pro Ser Ala Asp Pro Ala Ser
 1 5 10 15

Ile Leu Arg Arg Leu Gln Thr Arg Ser Asp Ser Pro Pro Asp Asp Gly
 20 25 30

Phe Thr His Glu Gly Leu Leu Gln Arg Gln Ala Leu Leu His Arg Ser
 35 40 45

Ala Asp Leu Leu Thr Asp Pro Ser Glu Arg Ala Asp Tyr Glu Ala Ala
 50 55 60

Leu Leu
 65

<210> 104
 <211> 66
 <212> PRT
 <213> Synechocystis PCC6803

<400> 104

Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln Ser Gly Gly Glu Thr
 1 5 10 15

Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln Leu Pro Arg Arg Glu
 20 25 30

Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln Leu Leu Ala Ile Ala
 35 40 45

Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln Ala Tyr Asp Gln Glu
 50 55 60

Trp Trp
 65

<210> 105
<211> 66
<212> PRT
<213> Nostoc punctiforme

<400> 105

Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Glu Glu Gln
1 5 10 15

Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu
20 25 30

Tyr Ser Gln Ala Ala Ile Ser Ser Arg Lys Gln Leu Ile Glu Glu Ala
35 40 45

Tyr Val Val Leu Ser Asp Pro Lys Gln Arg Ser Thr Tyr Asp Gln Leu
50 55 60

Tyr Leu
65

<210> 106
<211> 66
<212> PRT
<213> Anabaena PCC7120

<400> 106

Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln
1 5 10 15

Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu
20 25 30

Tyr Ser Gln Ala Ala Ile Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala
35 40 45

Tyr Val Val Leu Ser Asp Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu
50 55 60

Tyr Leu
65

<210> 107
 <211> 66
 <212> PRT
 <213> Bombyx mori

<400> 107

Asp Tyr Tyr Ala Leu Leu Gly Cys Asp Glu Asn Ser Thr Val Glu Gln
 1 5 10 15

Ile Thr Ala Glu Tyr Lys Ile Leu Ala Leu Gln His His Pro Asp Lys
 20 25 30

Asn Asp Gly Glu Lys Glu Ala Glu Met Lys Phe Gln Lys Leu Lys Glu
 35 40 45

Ala Lys Glu Ile Leu Cys Asp Pro Ser Lys Arg Ala Leu Tyr Asp Lys
 50 55 60

Trp Arg
 65

<210> 108
 <211> 66
 <212> PRT
 <213> Drosophila melanogaster

<400> 108

Asp Phe Tyr Gly Leu Leu His Cys Asp Glu Asn Ser Ser Pro Glu Gln
 1 5 10 15

Ile Gln Ala Glu Tyr Lys Val Leu Ala Leu Gln Tyr His Pro Asp Lys
 20 25 30

Asn Ser Gly Asp Lys Glu Ala Glu Ala Lys Phe Gln Gln Leu Lys Glu
 35 40 45

Ala Lys Glu Thr Leu Cys Asp Pro Glu Lys Arg Ala Ile Tyr Asp Lys
 50 55 60

Trp Arg
 65

<210> 109
 <211> 66
 <212> PRT
 <213> Mus musculus

<400> 109

Asp Tyr Tyr Ala Leu Leu Gly Cys Asp Glu Leu Ser Ser Val Glu Gln
 1 5 10 15

Ile Leu Ala Glu Phe Lys Ile Arg Ala Leu Glu Cys His Pro Asp Lys
 20 25 30

His Pro Glu Asn Ser Lys Ala Val Glu Thr Phe Gln Lys Leu Gln Lys
 35 40 45

Ala Lys Glu Ile Leu Cys Asn Ala Glu Ser Arg Ala Arg Tyr Asp His
 50 55 60

Trp Arg
 65

<210> 110
 <211> 65
 <212> PRT
 <213> Saccharomyces cerevisiae

<400> 110

Asp Ala Tyr Ser Ile Leu Gly Val Pro Pro Asp Ser Ser Gln Glu Gln
 1 5 10 15

Ile Arg Lys His Tyr Lys Lys Ile Ala Val Leu Val His Pro Asp Lys
 20 25 30

Asn Lys Gln Ala Gly Ala Glu Glu Ala Phe Lys Val Leu Gln Arg Ala
 35 40 45

Phe Glu Leu Ile Gly Glu Pro Glu Asn Arg Leu Ile Tyr Asp Gln Ser
 50 55 60

Ile
 65

<210> 111
 <211> 64
 <212> PRT
 <213> Leishmania major

<400> 111

Glu Leu Tyr Gln Val Leu Glu Leu Asp Ala Gln Cys Thr Thr Ala Glu
 1 5 10 15

Ile Ser Gln Gln Tyr Arg Arg Leu Ala Leu Arg Tyr His Pro Asp Arg
 20 25 30

Asn Ala Gly Ala Thr Val Glu Gln Phe Gln Arg Ile Glu Glu Ala His
 35 40 45

Arg Val Leu Ser Asp Leu Arg Gln Arg Gln Leu Tyr Asp Thr Val Gly
 50 55 60

<210> 112
 <211> 67
 <212> PRT
 <213> Schizosaccharomyces pombe

<400> 112

Asp Tyr Tyr Thr Ile Leu Gly Ala Glu Ser Thr Ser Ser Tyr Val Glu
 1 5 10 15

Ile Arg Gln Gln Tyr Leu Lys Leu Val Leu Arg Tyr His Pro Asp Arg
 20 25 30

Asn Pro Gly Arg Glu Ala Glu Val Leu Pro Gln Phe Gln Leu Ile Gln
 35 40 45

Lys Ala His Glu Val Leu Lys Asp Pro Lys Leu Arg Glu Leu Phe Asp
 50 55 60

Gln Arg Arg
 65

<210> 113
 <211> 67
 <212> PRT
 <213> Schizosaccharomyces pombe

<400> 113

Asp Tyr Tyr Ala Ile Leu Lys Leu Gln Lys Asn Ala Thr Phe Gln Gln
 1 5 10 15

Ile Arg Lys Gln Tyr Leu Phe Leu Ala Leu Gln Tyr His Pro Asp Arg
 20 25 30

Asn Pro Gly Asp Glu Glu Arg Ala Val Lys Arg Phe Gln Arg Leu Gln
 35 40 45

Leu Ala His Glu Val Leu Ser Asp Ala Thr Lys Arg Leu Ile Tyr Asp
 50 55 60

Gln Leu Phe
 65

<210> 114
 <211> 68
 <212> PRT
 <213> Schizosaccharomyces pombe

<400> 114

Asn His Tyr Ser Val Leu Asn Leu Lys Asp Gly Lys Thr Tyr Thr Asp
 1 5 10 15

Asp Glu Ile Lys Glu Ala Tyr Arg Lys Ala Leu Leu Leu Phe His Pro
 20 25 30

Asp Lys Cys Lys Glu Lys Pro Ser Val Val Tyr Thr Ile Asp Gln Val
 35 40 45

Lys Glu Ala Tyr Gln Val Leu Ser Ser Glu Lys Asp Arg Gln Gln Tyr
 50 55 60

Gln Ile Lys Gln
 65

<210> 115
 <211> 652
 <212> PRT
 <213> Anabaena PCC7120

<400> 115

Gln Gly Lys Tyr Ala Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu
 1 5 10 15

Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln Leu Arg Gln Ala Tyr Ser
 20 25 30

Asp Arg Ile Val Gln Leu Pro Arg Arg Glu Tyr Ser Gln Ala Ala Ile
 35 40 45

Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala Tyr Val Val Leu Ser Asp
 50 55 60

Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu Tyr Leu Ala His Ala Tyr
 65 70 75 80

Asp Pro Asp Asn Ala Ala Thr Thr Lys Val Ala Val Glu Asn Arg Gly
 85 90 95

Asp Ser Asn Asn Gly His Phe Asp Val Gln Ser Leu Ser Ile Glu Val
 100 105 110

Ser Ser Glu Glu Leu Ile Gly Ala Leu Leu Ile Leu Gln Glu Leu Gly
 115 120 125

Glu Tyr Glu Leu Val Leu Lys Leu Gly Arg Asn Tyr Leu Gly Asn Gln
 130 135 140

Asn Gly Thr Ala Ser Thr Arg Asn Gly Asn His Arg Thr Pro Glu Glu
 145 150 155 160

Phe Leu Asp Ser Ser Glu Arg Pro Asp Ile Leu Leu Thr Val Ala Leu
 165 170 175

Ala Ser Leu Glu Leu Gly Arg Glu Gln Trp Gln Gln Gly His Tyr Glu
 180 185 190

Asn Ala Ala Leu Ser Leu Glu Thr Gly Gln Glu Val Leu Phe Ser Glu
 195 200 205

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Ile | Phe | Pro | Ser | Val | Gln | Ala | Glu | Ile | Gln | Ala | Asp | Leu | Tyr | Lys | 210 | 215 | 220 |
| Leu | Arg | Pro | Tyr | Arg | Ile | Leu | Glu | Leu | Leu | Ala | Leu | Pro | Gln | Glu | Lys | 225 | 230 | 235 |
| Thr | Ile | Glu | Arg | His | Gln | Gly | Leu | Asp | Leu | Leu | Gln | Ser | Ile | Leu | Asp | 245 | 250 | 255 |
| Asp | Arg | Gly | Gly | Ile | Asp | Gly | Thr | Gly | Asn | Asp | Gln | Ser | Gly | Leu | Asn | 260 | 265 | 270 |
| Ile | Asp | Asp | Phe | Leu | Arg | Phe | Ile | Gln | Gln | Leu | Arg | His | His | Leu | Thr | 275 | 280 | 285 |
| Val | Ala | Glu | Gln | His | Lys | Leu | Phe | Asp | Gly | Glu | Ser | Lys | Arg | Pro | Ser | 290 | 295 | 300 |
| Ala | Val | Ala | Thr | Tyr | Leu | Ala | Val | Tyr | Ala | Ser | Ile | Ala | Arg | Gly | Phe | 305 | 310 | 315 |
| Thr | Gln | Arg | Gln | Pro | Ala | Leu | Ile | Arg | His | Ala | Lys | Gln | Ile | Leu | Met | 325 | 330 | 335 |
| Arg | Leu | Ser | Lys | Arg | Gln | Asp | Val | His | Leu | Glu | Gln | Ser | Leu | Cys | Ala | 340 | 345 | 350 |
| Leu | Leu | Leu | Gly | Gln | Thr | Glu | Glu | Ala | Thr | Arg | Val | Leu | Glu | Leu | Ser | 355 | 360 | 365 |
| Gln | Glu | Tyr | Glu | Ala | Leu | Ala | Leu | Ile | Arg | Glu | Lys | Ser | Gln | Asp | Ser | 370 | 375 | 380 |
| Pro | Asp | Leu | Leu | Pro | Gly | Leu | Cys | Leu | Tyr | Ala | Glu | Gln | Trp | Leu | Gln | 385 | 390 | 395 |
| Asn | Glu | Val | Phe | Pro | His | Phe | Arg | Asp | Leu | Ser | Arg | Gln | Gln | Ala | Ser | 405 | 410 | 415 |
| Leu | Lys | Asp | Tyr | Phe | Ala | Asn | Gln | Gln | Val | Gln | Ala | Tyr | Leu | Glu | Ala | 420 | 425 | 430 |

Leu Pro Asn Asp Ala Glu Thr Thr Asn Glu Trp Ala Val Ile Asn Arg
 435 440 445

Gln Ser Phe Ser Gln Pro Arg Gly Asn Ser Tyr Ser Gly Gly Thr Pro
 450 455 460

Val Ala Lys Arg Pro Val Gly Lys Ala Asn Arg Pro Gly Glu Ala Ser
 465 470 475 480

Thr Arg Pro Val Pro Gln Arg Ser His Pro Ser Glu Val Asn Arg Gln
 485 490 495

Phe His Gln Asn Arg Thr Pro Asp Pro Glu Leu Pro Glu Thr Ser Asn
 500 505 510

His Arg Arg Pro Glu Ser Ser Asn Phe Thr Thr Ala Arg Glu Asn Ile
 515 520 525

Ser Thr Thr Asp Ala Tyr Thr Asp Asn Tyr Pro Pro Glu Ile Pro Val
 530 535 540

Glu Arg Ala Ser Arg Pro Val Gln Pro Gly Val Ser Gly Tyr Thr Gln
 545 550 555 560

Ser Thr Pro Pro Arg Gln Thr Pro Lys Arg Arg Arg Arg Lys Lys Pro
 565 570 575

Gln Ala Val Val Asn Arg Gly His Ser Ile His Gln Gln Arg Gln Pro
 580 585 590

Ser Pro Ser Thr Leu Gly Arg Lys Thr Arg Leu Leu Trp Ile Val Leu
 595 600 605

Gly Ser Leu Gly Gly Ile Leu Leu Phe Trp Leu Ile Val Ser Thr Thr
 610 615 620

Phe Gly Trp Leu Lys Asn Val Phe Phe Pro Ala Pro Ser Leu Gln Gly
 625 630 635 640

Glu Gln Leu Ser Ile Gln Ile Ser Gln Pro Pro Leu
 645 650

<210> 116
 <211> 624
 <212> PRT
 <213> Nostoc punctiforme

<400> 116

Met Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala
 1 5 10 15

Ala Ser Glu Glu Gln Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln
 20 25 30

Leu Pro Arg Arg Glu Tyr Ser Gln Ala Ala Ile Ser Ser Arg Lys Gln
 35 40 45

Leu Ile Glu Glu Ala Tyr Val Val Leu Ser Asp Pro Lys Gln Arg Ser
 50 55 60

Thr Tyr Asp Gln Leu Tyr Leu Ala His Ala Tyr Asp Pro Asp Asn Leu
 65 70 75 80

Ala Ala Ala Ala Val Ala Gln Glu Asn Arg Thr Glu Ser Thr Lys Arg
 85 90 95

Gly Ser Asp Thr Gln Ser Leu Gly Ile Glu Ile Thr Gln Asp Glu Leu
 100 105 110

Val Gly Ala Leu Leu Ile Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val
 115 120 125

Leu Lys Leu Gly Arg Pro Tyr Leu Val Asn Lys Asn Ser Ala Thr Ser
 130 135 140

Ser Arg Lys Ser Asn Asn Leu Ala Asp Glu Glu Ile Tyr Glu Ser Ala
 145 150 155 160

Glu His Pro Asp Val Val Leu Thr Val Ala Leu Ala Cys Leu Glu Leu
 165 170 175

Gly Arg Glu Gln Trp Gln Gln Gly His Tyr Glu Asn Ala Ala Ile Ser
 180 185 190

Leu Glu Thr Gly Gln Glu Leu Leu Val Arg Glu Gly Leu Phe Ser Ser
 195 200 205

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Ile | Gln | Ala | Glu | Ile | Gln | Ala | Asp | Leu | Tyr | Lys | Leu | Arg | Pro | Tyr | Arg | | |
| 210 | | | | | | 215 | | | | | 220 | | | | | | |
| Ile | Leu | Glu | Leu | Leu | Ala | Leu | Pro | Gln | Glu | Lys | Thr | Ala | Glu | Arg | Ser | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Gln | Gly | Leu | Glu | Leu | Leu | Gln | Asn | Leu | Leu | Glu | Asp | Arg | Gly | Gly | Ile | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Asp | Gly | Thr | Asn | Asn | Asp | Glu | Ser | Gly | Leu | Asn | Ile | Asp | Asp | Phe | Leu | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Arg | Phe | Ile | Gln | Gln | Leu | Arg | Asn | His | Leu | Thr | Val | Ala | Glu | Gln | His | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | |
| Lys | Leu | Phe | Glu | Ala | Gln | Ser | Lys | Arg | Ser | Ser | Ala | Val | Ala | Thr | Tyr | | |
| | 290 | | | | | 295 | | | | | 300 | | | | | | |
| Leu | Ala | Val | Tyr | Ala | Leu | Ile | Ala | Arg | Gly | Phe | Ala | Gln | Arg | Gln | Pro | | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | | |
| Ala | Leu | Ile | Arg | Gln | Ala | Arg | Gln | Met | Leu | Val | Arg | Leu | Gly | Lys | Arg | | |
| | | | | 325 | | | | | 330 | | | | | 335 | | | |
| Gln | Asp | Val | His | Leu | Glu | Gln | Ser | Leu | Cys | Ala | Leu | Leu | Leu | Gly | Gln | | |
| | | | 340 | | | | | 345 | | | | | 350 | | | | |
| Thr | Glu | Glu | Ala | Thr | Arg | Val | Leu | Glu | Leu | Ser | Gln | Glu | Tyr | Glu | Ala | | |
| | | 355 | | | | | 360 | | | | | 365 | | | | | |
| Leu | Ala | Phe | Ile | Arg | Glu | Lys | Ser | Gln | Asp | Ser | Pro | Asp | Leu | Leu | Pro | | |
| | 370 | | | | | 375 | | | | | 380 | | | | | | |
| Gly | Leu | Cys | Leu | Tyr | Ala | Glu | Gln | Trp | Leu | Gln | His | Glu | Val | Phe | Pro | | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | | |
| His | Phe | Arg | Asp | Leu | Ala | Asn | Gln | Gln | Ala | Phe | Leu | Lys | Asp | Tyr | Phe | | |
| | | | | 405 | | | | | 410 | | | | | 415 | | | |

Ala Asn Gln Gln Val Gln Ala Tyr Leu Glu Ala Leu Pro Thr Asp Ala
420 425 430

Gln Thr Thr Asn Glu Trp Ala Val Ile Asn Pro Gln Tyr Phe Pro Gln
435 440 445

Ala Lys Ala Lys Asn Thr His Phe His Asn Asn Ser Thr Lys Thr Ser
450 455 460

Ala Ser Phe Asn His Ser Arg Val Pro Asn Pro Asp Leu Pro Glu Thr
465 470 475 480

Pro Thr Lys Glu Thr Ser Glu Tyr Pro Asn Phe Ser Pro Pro Met Trp
485 490 495

Ser Ser Ser Gly Ser Ile Lys Ser Glu Val Pro Ala Ala Glu Arg Met
500 505 510

Ser Arg Gly Thr Asn Gln His Leu Asn Gly Ser Ala Lys Ser Ala Ala
515 520 525

Ser Gly His Asn Gln Lys Arg Arg Arg Arg Lys Pro Thr Pro Ser Ala
530 535 540

Ser Arg Glu Arg Ile Pro Asp Asn Arg Pro His Ser Arg Arg Pro Arg
545 550 555 560

Arg Arg Arg Thr Phe Ala Asn Thr Ile Glu Gly Lys Thr Arg Leu Val
565 570 575

Trp Arg Val Phe Ile Ser Leu Val Ser Ile Leu Val Phe Trp Val Leu
580 585 590

Ala Thr Thr Thr Phe Gly Trp Leu Lys Asn Leu Phe Phe Pro Gln Pro
595 600 605

Ser Pro Pro Asp Leu Gln Leu Phe Val Gln Ile Asn Gln Pro Pro Leu
610 615 620

<210> 117
 <211> 557
 <212> PRT
 <213> Protochlorococcus marinus MED4

<400> 117

Met Glu Leu Pro Leu Asp His Phe Arg Leu Ile Gly Val Ser Pro Ser
 1 5 10 15

Ala Thr Ser Glu Glu Ile Leu Arg Ala Phe Gln Leu Arg Leu Asp Lys
 20 25 30

Thr Pro Asp Glu Gly Phe Thr Tyr Glu Val Leu Thr Gln Arg Ser Glu
 35 40 45

Leu Leu Arg Leu Thr Ala Asp Leu Leu Thr Asp Pro Asp Ser Arg Arg
 50 55 60

Asp Tyr Glu Asn Leu Leu Leu Asn Gly Ala Ser Gly Leu Asp Leu Ser
 65 70 75 80

Ser Asn Arg Glu Val Ala Gly Leu Ile Leu Leu Trp Glu Ser Gly Ser
 85 90 95

Ser Lys Glu Ala Phe Lys Ile Thr Arg Lys Ala Leu Gln Pro Pro Gln
 100 105 110

Thr Pro Ala Leu Gly Ser Ser Arg Glu Ala Asp Leu Thr Leu Leu Ala
 115 120 125

Ala Leu Thr Ser Arg Asp Ala Ala Ile Gln Glu Gln Asp Gln Arg Ser
 130 135 140

Tyr Ser Asn Ala Ala Asp Phe Leu Gln Glu Gly Ile Gln Leu Leu Gln
 145 150 155 160

Arg Met Gly Lys Leu Gly Glu Leu Arg Lys Thr Leu Glu Glu Asp Leu
 165 170 175

Val Ser Leu Leu Pro Tyr Arg Ile Leu Asp Leu Leu Ser Arg Asp Leu
 180 185 190

Asn Asp Tyr Asp Ser His Lys Lys Gly Leu Ser Met Leu Glu Asn Leu
 195 200 205

Thr Gly Pro Asp Leu Asn Ser Asp Asn Phe Glu Glu Gly Arg Leu Pro
420 425 430

Leu Pro Gly Gly Val Arg Glu Asp Gly Gln Glu Val Ile Glu Glu Asn
435 440 445

Ile Tyr Thr Asp Glu Ile Ile Lys Asn Lys Ser Ile Glu Phe Tyr Lys
450 455 460

Tyr Ala Ile Glu Lys Ile Ala Glu Leu Lys Phe Val Phe Gly Glu Ala
465 470 475 480

Leu Glu Asn Tyr Arg Ile Phe Asn Lys Ser Ser Tyr Leu Thr Tyr Leu
485 490 495

Tyr Ala Phe Leu Ile Leu Phe Ala Phe Gly Leu Gly Val Gly Phe Val
500 505 510

Arg Asn Asn Leu Lys Lys Pro Val Gln Glu Lys Glu Ile Ile Asp Asn
515 520 525

Ser Leu Ser Ile Asn Glu Asn Lys Asn Val Phe Tyr Glu Gly Leu Asn
530 535 540

Gln Asp Asp Lys Lys Lys Val Leu Asp Asn Ser Lys Ile
545 550 555

<210> 118
<211> 524
<212> PRT
<213> Protochlorococcus marinus MT9313

<400> 118

Met Ala Ala Gln Leu Val Asp Leu Pro Ile Asp His Phe Arg Leu Leu
1 5 10 15

Gly Val Ser Pro Ser Ala Asp Ser Glu Ala Ile Leu Arg Ala Leu Glu
20 25 30

Leu Arg Leu Asp Arg Cys Pro Asp Gln Gly Phe Thr His Glu Val Leu
35 40 45

Ile Gln Arg Ala Glu Leu Leu Arg Leu Ser Ala Asp Leu Leu Thr Asp
50 55 60

Pro Pro Arg Arg Gln Ala Tyr Glu Thr Ala Leu Leu Glu Leu Ser Arg
 65 70 75 80
 Asp His Pro Gly Glu Thr Ala Gly Leu Asp Val Ser Pro Ser Arg Glu
 85 90 95
 Val Ala Gly Leu Ile Leu Leu Phe Glu Ala Asn Ser Ser His Glu Val
 100 105 110
 Phe His Leu Ala Ser Gln Gly Leu Gln Pro Pro Gln Ser Pro Thr Leu
 115 120 125
 Gly Ser Glu Arg Glu Ala Asp Leu Ala Leu Leu Leu Ala Leu Ala Cys
 130 135 140
 Arg Ala Ala Ala Ala Glu Glu Gln Glu Gln Arg Arg Tyr Glu Ala Ala
 145 150 155 160
 Ala Ser Leu Leu His Asp Gly Ile Gln Leu Leu Gln Arg Met Gly Lys
 165 170 175
 Leu Ser Glu Glu Cys His Lys Leu Glu Asn Asp Leu Asp Ala Leu Leu
 180 185 190
 Pro Tyr Arg Ile Leu Asp Leu Leu Ser Arg Asp Leu Gly Asp Gln Val
 195 200 205
 Ser His Gln Glu Gly Leu Arg Leu Leu Asp Asn Phe Val Ser Gln Arg
 210 215 220
 Gly Gly Leu Glu Gly Thr Ala Pro Ser Pro Ala Pro Gly Gly Leu Asp
 225 230 235 240
 Gln Ser Glu Phe Asp Asn Phe Phe Lys Gln Ile Arg Lys Phe Leu Thr
 245 250 255
 Val Gln Glu Gln Val Asp Leu Phe Leu Arg Trp Gln Gln Ala Gly Ser
 260 265 270
 Ala Asp Ala Gly Phe Leu Gly Gly Leu Ala Leu Ala Ala Val Gly Phe
 275 280 285

Ser Arg Arg Lys Pro Glu Arg Val Gln Glu Ala Arg Gln His Leu Glu
 290 295 300

Arg Leu Gln Leu Asp Gly Cys Asp Pro Leu Pro Met Leu Gly Cys Leu
 305 310 315 320

Asp Leu Leu Leu Gly Asp Val Gly Arg Ala Gln Glu Arg Phe Leu Arg
 325 330 335

Ser Thr Asp Pro Arg Val Lys Asp Cys Leu Asn Ser His Pro Gly Asp
 340 345 350

Glu Leu Ala Ala Phe Cys Glu Tyr Cys Arg Ser Trp Leu Arg Gly Asp
 355 360 365

Val Leu Pro Gly Tyr Arg Asp Val Asp Ala Glu Ala Val Asp Leu Glu
 370 375 380

Ala Trp Phe Ala Asp Arg Asp Val Gln Ala Tyr Val Glu Arg Leu Glu
 385 390 395 400

Arg Ser Glu Asn Arg Ala Ser Ser Leu Gly Lys Ala Phe Ser Gly Ser
 405 410 415

Ser Val Lys Gln Pro Phe Pro Trp Ala Pro Leu Asp Pro Asp Gly Ile
 420 425 430

Leu Pro Leu Ser Leu Gly Gly Pro Asp Val Gly Gln Pro Ala Ala Asp
 435 440 445

Gln Ser Ser Asp Glu Phe Ala Ser Asp Gly Met Ala Trp Ile Asp Arg
 450 455 460

Leu Ala Asp Leu Pro Arg Pro Thr Arg Pro Val Leu Ile Gly Ser Val
 465 470 475 480

Val Phe Ala Ala Leu Ile Ala Ala Phe Ala Gly Phe Ser Leu Phe Gly
 485 490 495

Gln Arg Pro Arg Thr Ser Val Ser Thr Ala Ala Asp Gln Pro Gln Val
 500 505 510

Thr Ala Pro Pro Thr Ala Thr Leu Gln Glu Glu Val
515 520

<210> 119
<211> 566
<212> PRT
<213> Synechocystis PCC6803

<400> 119

Met Phe Ile Pro Leu Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln
1 5 10 15

Ser Gly Gly Glu Thr Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln
20 25 30

Leu Pro Arg Arg Glu Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln
35 40 45

Leu Leu Ala Ile Ala Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln
50 55 60

Ala Tyr Asp Gln Glu Trp Trp Gly Ala Met Asp Glu Ala Leu Gly Glu
65 70 75 80

Ala Leu Pro Leu Thr Thr Pro Glu Leu Glu Cys Ser Pro Glu Gln Glu
85 90 95

Ile Gly Ala Leu Leu Ile Leu Leu Asp Leu Gly Glu Tyr Glu Leu Val
100 105 110

Val Lys Tyr Gly Glu Pro Val Leu His Asp Pro Asn Pro Pro Ala Gly
115 120 125

Gly Leu Pro Gln Asp Tyr Leu Leu Ser Val Ile Leu Ala His Trp Glu
130 135 140

Leu Ser Arg Glu Arg Trp Gln Gln Gln Gln Tyr Glu Phe Ala Ala Thr
145 150 155 160

Ala Ser Leu Lys Ala Leu Ala Arg Leu Gln Gln Asp Asn Asp Phe Pro
165 170 175

Ala Leu Glu Ala Glu Ile Arg Gln Glu Leu Tyr Arg Leu Arg Pro Tyr
180 185 190

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Ile | Leu | Glu | Leu | Leu | Ala | Lys | Glu | Gly | Gln | Gly | Glu | Glu | Gln | Arg | 195 | 200 | 205 | |
| Gln | Gln | Gly | Leu | Ala | Leu | Leu | Gln | Ala | Met | Val | Gln | Asp | Arg | Gly | Gly | 210 | 215 | 220 | |
| Ile | Glu | Gly | Lys | Gly | Glu | Asp | Tyr | Ser | Gly | Leu | Gly | Asn | Asp | Asp | Phe | 225 | 230 | 235 | 240 |
| Leu | Lys | Phe | Ile | His | Gln | Leu | Arg | Cys | His | Leu | Thr | Val | Ala | Glu | Gln | 245 | 250 | 255 | |
| Asn | Ala | Leu | Phe | Leu | Pro | Glu | Ser | Gln | Arg | Pro | Ser | Leu | Val | Ala | Ser | 260 | 265 | 270 | |
| Tyr | Leu | Ala | Val | His | Ser | Leu | Met | Ala | Glu | Gly | Val | Lys | Glu | Gln | Asp | 275 | 280 | 285 | |
| Pro | Met | Ala | Ile | Val | Glu | Ala | Lys | Ser | Leu | Ile | Ile | Gln | Leu | Glu | Asn | 290 | 295 | 300 | |
| Cys | Gln | Asp | Leu | Ala | Leu | Glu | Lys | Val | Ile | Cys | Glu | Leu | Leu | Leu | Gly | 305 | 310 | 315 | 320 |
| Gln | Thr | Glu | Val | Val | Leu | Ala | Ala | Ile | Asp | Gln | Gly | Asp | Pro | Lys | Ile | 325 | 330 | 335 | |
| Val | Ala | Gly | Leu | Glu | Ser | Lys | Leu | Ala | Thr | Gly | Glu | Asp | Pro | Leu | Thr | 340 | 345 | 350 | |
| Ala | Phe | Tyr | Thr | Phe | Thr | Glu | Gln | Trp | Leu | Glu | Glu | Glu | Ile | Val | Pro | 355 | 360 | 365 | |
| Tyr | Phe | Arg | Asp | Leu | Ser | Pro | Glu | Thr | Leu | Ser | Pro | Lys | Ala | Tyr | Phe | 370 | 375 | 380 | |
| Asn | Asn | Pro | Ser | Val | Gln | Gln | Tyr | Leu | Glu | Gln | Leu | Glu | Pro | Asp | Ser | 385 | 390 | 395 | 400 |
| Phe | Thr | Thr | Asp | Asn | Ser | Phe | Ala | Ser | Pro | Ala | Leu | Leu | Ser | Thr | Ala | 405 | 410 | 415 | |

Thr Glu Ser Glu Thr Pro Met Val His Ser Ser Ala Ala Leu Pro Asp
 420 425 430

Arg Pro Leu Thr Ser Thr Val Pro Ser Arg Arg Gly Arg Ser Pro Arg
 435 440 445

Arg Ser Arg Asp Asp Val Phe Pro Ser Ala Asp Asn Ser Ser Gly Leu
 450 455 460

Ala Val Thr Thr Leu Ser Pro Ala Ile Ala Tyr Asp Thr His Ser Leu
 465 470 475 480

Gly Thr Asn Gly Ile Gly Gly Asp Ser Thr Ser Asn Gly Phe Ser Ser
 485 490 495

Asn Ser Ala Pro Glu Ser Thr Ser Lys His Lys Ser Pro Arg Arg Arg
 500 505 510

Lys Lys Arg Val Thr Ile Lys Pro Val Arg Phe Gly Ile Phe Leu Leu
 515 520 525

Cys Leu Ala Gly Ile Val Gly Gly Ala Thr Ala Leu Ile Ile Asn Arg
 530 535 540

Thr Gly Asp Pro Leu Gly Gly Leu Leu Glu Asp Pro Leu Asp Val Phe
 545 550 555 560

Leu Asp Gln Pro Ser Glu
 565

<210> 120
 <211> 573
 <212> PRT
 <213> Synechococcus PCC7002

<400> 120

Thr Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Cys Val Pro Ala
 1 5 10 15

Lys Ala Thr Thr Ala Gln Ile Thr Gln Ala Tyr Arg Asp Arg Leu Ser
 20 25 30

Gln Phe Pro Arg Arg Glu His Asn Ala Leu Ala Ile Glu Ala Arg Asn
 35 40 45

Arg Ile Ile Glu Gln Ala Phe Glu Val Leu Ser Gln Thr Glu Thr Arg
 50 55 60

Ala Val Tyr Asp His Glu Leu Ser Gly Asn Met Phe Arg Ser Leu Val
 65 70 75 80

Pro Ser Arg Pro Lys Leu Pro Phe Pro Asp Arg Pro Ser Ser Asp Thr
 85 90 95

Glu Leu Glu Ala Leu Thr Ala His Gln Pro Thr Ile Asp Ile Ala Glu
 100 105 110

Lys Asp Leu Leu Gly Gly Leu Leu Leu Leu Asp Leu Gly Glu Tyr
 115 120 125

Glu Leu Val Leu Lys Trp Ala Ala Pro Tyr Leu Lys Gly Lys Gly Lys
 130 135 140

Leu Val Lys Glu Gly Lys Phe Gly Ala Val Glu Ile Val Glu Gln Glu
 145 150 155 160

Leu Arg Leu Cys Leu Ala Leu Ala His Trp Glu Leu Ser Arg Glu Gln
 165 170 175

Trp Leu Gln Gln His Tyr Glu Gln Ala Ala Leu Ser Gly Gln Lys Ser
 180 185 190

Gln Glu Leu Leu Val Asp Val Ala Gln Phe Ala Asp Leu Gln Gln Glu
 195 200 205

Ile Gln Gly Asp Leu Asn Arg Leu Arg Pro Tyr Gln Val Leu Glu Leu
 210 215 220

Leu Ala Leu Pro Glu Ser Glu Thr Gln Glu Arg Gln Arg Gly Leu Gln
 225 230 235 240

Leu Leu Gln Glu Met Leu Ser Ala Arg Val Gly Ile Asp Gly Gln Gly
 245 250 255

Asp Asp Gln Ser Gly Leu Ser Ile Asp Asp Phe Leu Arg Phe Ile Gln
 260 265 270

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Leu | Arg | Ser | Tyr | Leu | Thr | Val | Gln | Glu | Gln | Leu | Asp | Leu | Phe | Val |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Ala | Glu | Ser | Lys | Arg | Pro | Ser | Ala | Ala | Ala | Ala | Tyr | Leu | Ala | Val | Tyr |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Ala | Leu | Leu | Ala | Ala | Gly | Phe | Ser | Gln | Arg | Lys | Pro | Asp | Leu | Val | Val |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Gln | Ala | Gln | Thr | Leu | Leu | Lys | Arg | Leu | Gly | Lys | Arg | Gln | Asp | Val | Phe |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Leu | Glu | Gln | Ser | Ile | Cys | Ala | Leu | Leu | Leu | Gly | Gln | Pro | Ser | Glu | Ala |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Asn | Gln | Leu | Leu | Glu | Gln | Ser | Gln | Glu | Gln | Glu | Ala | Ile | Ala | Tyr | Ile |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Gln | Glu | Gln | Ser | Glu | Gly | Ala | Pro | Asp | Leu | Leu | Pro | Gly | Leu | Cys | Leu |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Tyr | Gly | Glu | Gln | Trp | Leu | Lys | Thr | Glu | Val | Phe | Ser | His | Phe | Arg | Asp |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Leu | Arg | Gln | Arg | Leu | Glu | Asp | Gly | Ser | Val | Ser | Leu | Thr | Ala | Tyr | Phe |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Ala | Asp | Pro | Glu | Val | Gln | Gln | Tyr | Leu | Asp | Asp | Leu | Leu | Thr | Glu | Ala |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Val | Pro | Thr | Pro | Thr | Pro | His | Pro | Asp | Thr | Glu | Ser | Thr | Ala | Ala | Pro |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Ser | Glu | Lys | Pro | Pro | Glu | Thr | Leu | Gln | Ser | Glu | Thr | Gly | Val | Ser | Pro |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| His | Pro | Ser | Arg | Pro | Ala | Lys | Val | Asp | Ser | Phe | Glu | Asp | Leu | Val | Thr |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Gln | Thr | Pro | Ala | Thr | Val | Pro | Pro | Ala | Pro | Pro | Ser | Pro | Gly | Val | Ala |
| | | | | 485 | | | | | 490 | | | | | 495 | |

Pro Val Thr Ala Ala Leu Asn Pro Asp Pro Glu Ala Ser Ser Ala Ser
500 505 510

Ser Lys Ser Val Ser Ser Lys Lys Ser Ile Gly Pro Trp Gly Ala Ile
515 520 525

Ala Ala Ile Val Gly Ser Val Leu Leu Val Val Gly Leu Val Arg Ile
530 535 540

Leu Ser Gly Leu Thr Thr Gln Glu Pro Leu Gln Val Thr Leu Asn Gly
545 550 555 560

Glu Pro Pro Leu Thr Ile Pro Ser Leu Asp Thr Ala Glu
565 570

<210> 121
<211> 515
<212> PRT
<213> Synechococcus WH8102

<400> 121

Gly Asp Leu Trp Thr Leu Asp Leu Pro Ile Asp His Phe Arg Leu Leu
1 5 10 15

Gly Val Ser Pro Ser Ala Asp Pro Ala Ser Ile Leu Arg Arg Leu Gln
20 25 30

Thr Arg Ser Asp Ser Pro Pro Asp Asp Gly Phe Thr His Glu Gly Leu
35 40 45

Leu Gln Arg Gln Ala Leu Leu His Arg Ser Ala Asp Leu Leu Thr Asp
50 55 60

Pro Ser Glu Arg Ala Asp Tyr Glu Ala Ala Leu Leu Ser Leu Ser Ala
65 70 75 80

Thr His Pro Asn Glu Thr Val Gly Leu Asp Leu Ala Ala Ser Ser Glu
85 90 95

Val Ala Gly Leu Ile Leu Leu Trp Glu Ala Gly Ala Ala Leu Glu Ala
100 105 110

Phe Gln Leu Ala Arg Gln Gly Leu Gln Pro Pro Gln Ala Pro Ala Leu
115 120 125

Gly Ser Gly Arg Glu Ala Asp Leu Thr Leu Leu Ala Ala Leu Ala Cys
 130 135 140

Arg Asp Ala Ala Arg Asp Glu Gln Gln Gln Arg Arg Tyr Glu Ser Ala
 145 150 155 160

Ala Gln Leu Leu Arg Asp Gly Ile Glu Leu Gln Gln Arg Met Gly Lys
 165 170 175

Leu Pro Asp Gln Gln Ala Arg Leu Gln Gln Glu Leu Asp Asp Leu Leu
 180 185 190

Pro Tyr Arg Val Leu Asp Leu Leu Ser Arg Asp Leu Ser Asp Ala Asp
 195 200 205

Ala Arg Gln Gln Gly Ile Ser Leu Leu Asp Gln Leu Val Arg Asp Arg
 210 215 220

Gly Gly Leu Asp Pro Glu Gly Leu Asp Ser Glu Thr Pro Ala Ala Met
 225 230 235 240

Gly Gln Ala Asp Phe Glu Ser Phe Phe Gln Gln Ile Arg Arg Phe Leu
 245 250 255

Thr Val Gln Glu Gln Val Asp Leu Phe Arg Gly Trp Phe Ala Glu Gly
 260 265 270

Ser Ile Glu Ala Gly Cys Leu Ala Val Phe Ala Leu Ala Ala Gly
 275 280 285

Tyr Ser Arg Arg Lys Pro Glu Phe Leu Glu Gln Ala Arg Glu Gln Leu
 290 295 300

Gln Arg Leu Val Ala Ser Asp Leu Asp Pro Met Pro Leu Leu Gly Cys
 305 310 315 320

Leu Asp Leu Leu Leu Gly Asn Val Ala Glu Ala Ser Leu His Phe Ser
 325 330 335

Ala Ile Arg Asp Glu Glu Leu Leu Ser Trp Leu Ala Glu His Pro Gly
 340 345 350

Asp His Leu Ala Ala Gln Cys Glu Tyr Cys Arg Val Trp Leu Glu Arg
 355 360 365

Asp Val Leu Pro Gly Tyr Arg Asp Val Asp Ala Ala Gly Val Asp Leu
 370 375 380

Asp Ala Trp Phe Ala Asp Arg Asp Val Gln Ala Tyr Val Asp Arg Ile
 385 390 395 400

Asp Arg Gln Ser Ala Arg Leu Gly Ser Ala Ala Thr Val Thr Gly Ala
 405 410 415

Gly Leu Ser Ser Ala Pro Ser Ala Asp Ala Ser Ser Pro His Glu Ala
 420 425 430

Ala Leu Asp Asp Asp His Leu Pro Ala Glu Glu Ala Pro Ser Ser Asp
 435 440 445

Pro Ala Asn Gln Arg Leu Ser Asn Arg Leu Arg Trp Leu Ala Ala Ser
 450 455 460

Leu Val Val Gly Leu Val Ala Ala Leu Ala Ala Val Met Leu Arg
 465 470 475 480

Pro Arg Glu Thr Ala Pro Val Val Leu Gln Pro Glu Pro Asp Arg Gln
 485 490 495

Asp Ala Val Glu Pro Lys Pro Ser Ala Gln Asp Ser Ala Thr Leu Lys
 500 505 510

Pro Gln Ala
 515

<210> 122
 <211> 525
 <212> PRT
 <213> Oryza sativa

<400> 122

Ala Ala Glu Arg Ser Leu Pro Leu Gln Val Asp Phe Tyr Lys Val Leu
 1 5 10 15

Gly Ala Glu Pro His Phe Leu Gly Asp Gly Ile Arg Arg Ala Phe Glu
 20 25 30

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Arg | Ile | Ala | Lys | Pro | Pro | Gln | Tyr | Gly | Tyr | Ser | Thr | Asp | Ala | Leu | 35 | 40 | 45 | |
| Val | Gly | Arg | Arg | Gln | Met | Leu | Gln | Ile | Ala | His | Asp | Thr | Leu | Met | Asn | 50 | 55 | 60 | |
| Gln | Asn | Ser | Arg | Thr | Gln | Tyr | Asp | Arg | Ala | Leu | Ser | Glu | Asn | Arg | Glu | 65 | 70 | 75 | 80 |
| Glu | Ala | Leu | Thr | Met | Asp | Ile | Ala | Trp | Asp | Lys | Glu | Ala | Gly | Glu | Ala | 85 | 90 | 95 | |
| Leu | Ala | Val | Leu | Val | Thr | Gly | Glu | Gln | Leu | Leu | Leu | Asp | Arg | Pro | Pro | 100 | 105 | 110 | |
| Lys | Arg | Phe | Lys | Gln | Asp | Val | Val | Leu | Ala | Met | Ala | Leu | Ala | Tyr | Val | 115 | 120 | 125 | |
| Asp | Leu | Ser | Arg | Asp | Ala | Met | Ala | Ala | Ser | Pro | Pro | Asp | Val | Ile | Gly | 130 | 135 | 140 | |
| Cys | Cys | Glu | Val | Leu | Glu | Arg | Ala | Leu | Lys | Leu | Leu | Gln | Glu | Asp | Gly | 145 | 150 | 155 | 160 |
| Ala | Ser | Asn | Leu | Ala | Pro | Asp | Leu | Leu | Ser | Gln | Ile | Asp | Glu | Thr | Leu | 165 | 170 | 175 | |
| Glu | Glu | Ile | Thr | Pro | Arg | Cys | Val | Leu | Glu | Leu | Leu | Ser | Leu | Pro | Ile | 180 | 185 | 190 | |
| Asp | Thr | Glu | His | His | Lys | Lys | Arg | Gln | Glu | Gly | Leu | Gln | Gly | Ala | Arg | 195 | 200 | 205 | |
| Asn | Ile | Leu | Trp | Ser | Val | Gly | Arg | Gly | Gly | Ile | Ala | Thr | Val | Gly | Gly | 210 | 215 | 220 | |
| Gly | Phe | Ser | Arg | Glu | Ala | Phe | Met | Asn | Glu | Ala | Phe | Leu | Arg | Met | Thr | 225 | 230 | 235 | 240 |
| Ser | Ile | Glu | Gln | Met | Asp | Phe | Phe | Ser | Lys | Thr | Pro | Asn | Ser | Ile | Pro | 245 | 250 | 255 | |

Pro Glu Trp Phe Glu Ile Tyr Asn Val Ala Leu Ala His Val Ala Gln
 260 265 270
 Ala Ile Ile Ser Lys Arg Pro Gln Phe Ile Met Met Ala Asp Asp Leu
 275 280 285
 Phe Glu Gln Leu Gln Lys Phe Asn Ile Gly Ser His Tyr Ala Tyr Asp
 290 295 300
 Asn Glu Met Asp Leu Ala Leu Glu Arg Ala Phe Cys Ser Leu Leu Val
 305 310 315 320
 Gly Asp Val Ser Lys Cys Arg Met Trp Leu Gly Ile Asp Asn Glu Ser
 325 330 335
 Ser Pro Tyr Arg Asp Pro Lys Ile Leu Glu Phe Ile Val Thr Asn Ser
 340 345 350
 Ser Ile Ser Glu Glu Asn Asp Leu Leu Pro Gly Leu Cys Lys Leu Leu
 355 360 365
 Glu Thr Trp Leu Ile Phe Glu Val Phe Pro Arg Ser Arg Asp Thr Arg
 370 375 380
 Gly Met Gln Phe Arg Leu Gly Asp Tyr Tyr Asp Asp Pro Glu Val Leu
 385 390 395 400
 Ser Tyr Leu Glu Arg Met Glu Gly Gly Gly Ala Ser His Leu Ala Ala
 405 410 415
 Ala Ala Ala Ile Ala Lys Leu Gly Ala Gln Ala Thr Ala Ala Leu Gly
 420 425 430
 Thr Val Lys Ser Asn Ala Ile Gln Ala Phe Asn Lys Val Phe Pro Leu
 435 440 445
 Ile Glu Gln Leu Asp Arg Ser Ala Met Glu Asn Thr Lys Asp Gly Pro
 450 455 460
 Gly Gly Tyr Leu Glu Asn Phe Asp Gln Glu Asn Ala Pro Ala His Asp
 465 470 475 480

Ser Arg Asn Ala Ala Leu Lys Ile Ile Ser Ala Gly Ala Leu Phe Ala
485 490 495

Leu Leu Ala Val Ile Gly Ala Lys Tyr Leu Pro Arg Lys Arg Pro Leu
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Ser Ala Ile Arg Ser Glu His Gly Ser Val Ala Val Ala
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<211> 578

<212> PRT

<213> Arabidopsis thaliana

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35 40 45

Ile Ser Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn
50 55 60

Pro Arg Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu
65 70 75 80

Ala Thr Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu
85 90 95

Cys Val Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly
100 105 110

Glu Ala Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val
115 120 125

Val Leu Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met
130 135 140

Ala Leu Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu
145 150 155 160

Ala Leu Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp
 165 170 175

Leu Arg Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr
 180 185 190

Val Leu Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys
 195 200 205

Arg Leu Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly
 210 215 220

Gly Gly Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe
 225 230 235 240

Met Asn Glu Ala Phe Leu Arg Met Thr Ala Ala Glu Gln Val Asp Leu
 245 250 255

Phe Val Ala Thr Pro Ser Asn Ile Pro Ala Glu Ser Phe Glu Val Tyr
 260 265 270

Glu Val Ala Leu Ala Leu Val Ala Gln Ala Phe Ile Gly Lys Lys Pro
 275 280 285

His Leu Leu Gln Asp Ala Asp Lys Gln Phe Gln Gln Leu Gln Gln Ala
 290 295 300

Lys Val Met Ala Met Glu Ile Pro Ala Met Leu Tyr Asp Thr Arg Asn
 305 310 315 320

Asn Trp Glu Ile Asp Phe Gly Leu Glu Arg Gly Leu Cys Ala Leu Leu
 325 330 335

Ile Gly Lys Val Asp Glu Cys Arg Met Trp Leu Gly Leu Asp Ser Glu
 340 345 350

Asp Ser Gln Tyr Arg Asn Pro Ala Ile Val Glu Phe Val Leu Glu Asn
 355 360 365

Ser Asn Arg Asp Asp Asn Asp Asp Leu Pro Gly Leu Cys Lys Leu Leu
 370 375 380

Glu Thr Trp Leu Ala Gly Val Val Phe Pro Arg Phe Arg Asp Thr Lys
 385 390 395 400

Asp Lys Lys Phe Lys Leu Gly Asp Tyr Tyr Asp Asp Pro Met Val Leu
 405 410 415

Ser Tyr Leu Glu Arg Val Glu Val Val Gln Gly Ser Pro Leu Ala Ala
 420 425 430

Ala Ala Ala Met Ala Arg Ile Gly Ala Glu His Val Lys Ala Ser Ala
 435 440 445

Met Gln Ala Leu Gln Lys Val Phe Pro Ser Arg Tyr Thr Asp Arg Asn
 450 455 460

Ser Ala Glu Pro Lys Asp Val Gln Glu Thr Val Phe Ser Val Asp Pro
 465 470 475 480

Val Gly Asn Asn Val Gly Arg Asp Gly Glu Pro Gly Val Phe Ile Ala
 485 490 495

Glu Ala Val Arg Pro Ser Glu Asn Phe Glu Thr Asn Asp Tyr Ala Ile
 500 505 510

Arg Ala Gly Val Ser Glu Ser Ser Val Asp Glu Thr Thr Val Glu Met
 515 520 525

Ser Val Ala Asp Met Leu Lys Glu Ala Ser Val Lys Ile Leu Ala Ala
 530 535 540

Gly Val Ala Ile Gly Leu Ile Ser Leu Phe Ser Gln Lys Tyr Phe Leu
 545 550 555 560

Lys Ser Ser Ser Ser Phe Gln Arg Lys Asp Met Val Ser Ser Met Glu
 565 570 575

Ser Asp

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 <211> 99
 <212> PRT
 <213> Solanum tuberosum

<400> 124

Pro Ser Asp His His Ile Ser Met Pro Ile Asp Phe Tyr Arg Val Leu
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Gly Ala Glu Ala His Phe Leu Gly Asp Gly Ile Arg Arg Cys Tyr Asp
 20 25 30

Ala Arg Ile Thr Lys Pro Pro Gln Tyr Gly Tyr Ser Gln Glu Ala Leu
 35 40 45

Ile Gly Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ala Asp
 50 55 60

Ser Thr Ser Arg Arg Glu Tyr Asn Gln Gly Leu Ala Gln His Glu Phe
 65 70 75 80

Asp Thr Ile Leu Thr Pro Val Pro Trp Asp Lys Val Pro Gly Ala Met
 85 90 95

Cys Val Leu

<210> 125
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 <212> PRT
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<400> 125

Met Glu Gly Phe His Asn Leu Leu Ala Arg Pro Asn Ser Ala Pro Phe
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Ala Phe Ser Leu Pro Arg Pro Arg Pro Arg Pro Arg Arg Arg Pro Pro
 20 25 30

Pro His Pro Ser Ala Ala Cys Arg Ala Ala Ser Arg Trp Ala Glu Arg
 35 40 45

Leu Phe Ala Asp Phe His Leu Leu Pro Thr Ala Ala Pro Ser Asp Pro
 50 55 60

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Ser | Pro | Ala | Pro | Ala | Pro | Ala | Ala | Ala | Pro | Ser | Ala | Ser | Pro | Phe |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Val | Pro | Leu | Phe | Pro | Asp | Ala | Ala | Glu | Arg | Ser | Leu | Pro | Leu | Gln | Val |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Asp | Phe | Tyr | Lys | Val | Leu | Gly | Ala | Glu | Pro | His | Phe | Leu | Gly | Asp | Gly |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ile | Arg | Arg | Ala | Phe | Glu | Ala | Arg | Ile | Ala | Lys | Pro | Pro | Gln | Tyr | Gly |
| | | | 115 | | | | 120 | | | | | | 125 | | |
| Tyr | Ser | Thr | Asp | Ala | Leu | Val | Gly | Arg | Arg | Gln | Met | Leu | Gln | Ile | Ala |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| His | Asp | Thr | Leu | Met | Asn | Gln | Asn | Ser | Arg | Thr | Gln | Tyr | Asp | Arg | Ala |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Leu | Ser | Glu | Asn | Arg | Glu | Glu | Ala | Leu | Thr | Met | Asp | Ile | Ala | Trp | Asp |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Lys | Glu | Ala | Gly | Glu | Ala | Leu | Ala | Val | Leu | Val | Thr | Gly | Glu | Gln | Leu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Leu | Leu | Asp | Arg | Pro | Pro | Lys | Arg | Phe | Lys | Gln | Asp | Val | Val | Leu | Ala |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Met | Ala | Leu | Ala | Tyr | Val | Asp | Leu | Ser | Arg | Asp | Ala | Met | Ala | Ala | Ser |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Pro | Pro | Asp | Val | Ile | Gly | Cys | Cys | Glu | Val | Leu | Glu | Arg | Ala | Leu | Lys |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Leu | Leu | Gln | Glu | Asp | Gly | Ala | Ser | Asn | Leu | Ala | Pro | Asp | Leu | Leu | Ser |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Gln | Ile | Asp | Glu | Thr | Leu | Glu | Glu | Ile | Thr | Pro | Arg | Cys | Val | Leu | Glu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Leu | Leu | Ser | Leu | Pro | Ile | Asp | Thr | Glu | His | His | Lys | Lys | Arg | Gln | Glu |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Gly | Leu | Gln | Gly | Ala | Arg | Asn | Ile | Leu | Trp | Ser | Val | Gly | Arg | Gly | Gly |
| | 290 | | | | | 295 | | | | | 300 | | | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Ala | Thr | Val | Gly | Gly | Gly | Phe | Ser | Arg | Glu | Ala | Phe | Met | Asn | Glu | 305 | 310 | 315 | 320 |
| Ala | Phe | Leu | Arg | Met | Thr | Ser | Ile | Glu | Gln | Met | Asp | Phe | Phe | Ser | Lys | 325 | 330 | 335 | |
| Thr | Pro | Asn | Ser | Ile | Pro | Pro | Glu | Trp | Phe | Glu | Ile | Tyr | Asn | Val | Ala | 340 | 345 | 350 | |
| Leu | Ala | His | Val | Ala | Gln | Ala | Ile | Ile | Ser | Lys | Arg | Pro | Gln | Phe | Ile | 355 | 360 | 365 | |
| Met | Met | Ala | Asp | Asp | Leu | Phe | Glu | Gln | Leu | Gln | Lys | Phe | Asn | Ile | Gly | 370 | 375 | 380 | |
| Ser | His | Tyr | Ala | Tyr | Asp | Asn | Glu | Met | Asp | Leu | Ala | Leu | Glu | Arg | Ala | 385 | 390 | 395 | 400 |
| Phe | Cys | Ser | Leu | Leu | Val | Gly | Asp | Val | Ser | Lys | Cys | Arg | Met | Trp | Leu | 405 | 410 | 415 | |
| Gly | Ile | Asp | Asn | Glu | Ser | Ser | Pro | Tyr | Arg | Asp | Pro | Lys | Ile | Leu | Glu | 420 | 425 | 430 | |
| Phe | Ile | Val | Thr | Asn | Ser | Ser | Ile | Ser | Glu | Glu | Asn | Asp | Leu | Leu | Pro | 435 | 440 | 445 | |
| Gly | Leu | Cys | Lys | Leu | Leu | Glu | Thr | Trp | Leu | Ile | Phe | Glu | Val | Phe | Pro | 450 | 455 | 460 | |
| Arg | Ser | Arg | Asp | Thr | Arg | Gly | Met | Gln | Phe | Arg | Leu | Gly | Asp | Tyr | Tyr | 465 | 470 | 475 | 480 |
| Asp | Asp | Pro | Glu | Val | Leu | Ser | Tyr | Leu | Glu | Arg | Met | Glu | Gly | Gly | Gly | 485 | 490 | 495 | |
| Ala | Ser | His | Leu | Ala | Ala | Ala | Ala | Ala | Ile | Ala | Lys | Leu | Gly | Ala | Gln | 500 | 505 | 510 | |
| Ala | Thr | Ala | Ala | Leu | Gly | Thr | Val | Lys | Ser | Asn | Ala | Ile | Gln | Ala | Phe | 515 | 520 | 525 | |

Asn Lys Val Phe Pro Leu Ile Glu Gln Leu Asp Arg Ser Ala Met Glu
 530 535 540

Asn Thr Lys Asp Gly Pro Gly Gly Tyr Leu Glu Asn Phe Asp Gln Glu
 545 550 555 560

Asn Ala Pro Ala His Asp Ser Arg Asn Ala Ala Leu Lys Ile Ile Ser
 565 570 575

Ala Gly Ala Leu Phe Ala Leu Leu Ala Val Ile Gly Ala Lys Tyr Leu
 580 585 590

Pro Arg Lys Arg Pro Leu Ser Ala Ile Arg Ser Glu His Gly Ser Val
 595 600 605

Ala Val Ala Asn Ser Val Asp Ser Thr Asp Asp Pro Ala Leu Asp Glu
 610 615 620

Asp Pro Val His Ile Pro Arg Met Asp Ala Lys Leu Ala Glu Asp Ile
 625 630 635 640

Val Arg Lys Trp Gln Ser Ile Lys Ser Lys Ala Leu Gly Pro Glu His
 645 650 655

Ser Val Ala Ser Leu Gln Glu Val Leu Asp Gly Asn Met Leu Lys Val
 660 665 670

Trp Thr Asp Arg Ala Ala Glu Ile Glu Arg His Gly Trp Phe Trp Glu
 675 680 685

Tyr Thr Leu Ser Asp Val Thr Ile Asp Ser Ile Thr Ile Ser Leu Asp
 690 695 700

Gly Arg Arg Ala Thr Val Glu Ala Thr Ile Asp Glu Ala Gly Gln Leu
 705 710 715 720

Thr Asp Val Thr Glu Pro Arg Asn Asn Asp Ser Tyr Asp Thr Lys Tyr
 725 730 735

Thr Thr Arg Tyr Glu Met Ala Phe Ser Lys Leu Gly Gly Trp Lys Ile
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Thr Glu Gly Ala Val Leu Lys Ser
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<211> 2283

<212> DNA

<213> Oryza sativa

<400> 126

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gagtcttcac catacagaga ccccaaaatt ctagagttta ttgtgaccaa ctctagcatc     1320

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agtgaagaga atgatcttct tccagggctg tgcaagcttt tggagacttg gcttatcttt 1380
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gctgctgctg ctgctattgc aaaacttggt gctcaagcta cagctgcact tggtagctg 1560
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tag 2283

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<213> Arabidopsis thaliana

<400> 127

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Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His Asn Thr
20           25           30

```

```

Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
35           40           45

```

```

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
50           55           60

```

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Thr | Thr | Thr | Ala | Thr | Leu | Val | Ser | Pro | Pro | Pro | Ser | Ile | Asp | Arg | Pro | | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | | |
| Glu | Arg | His | Val | Pro | Ile | Pro | Ile | Asp | Phe | Tyr | Gln | Val | Leu | Gly | Ala | | |
| | | | 85 | | | | | | 90 | | | | | 95 | | | |
| Gln | Thr | His | Phe | Leu | Thr | Asp | Gly | Ile | Arg | Arg | Ala | Phe | Glu | Ala | Arg | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| Val | Ser | Lys | Pro | Pro | Gln | Phe | Gly | Phe | Ser | Asp | Asp | Ala | Leu | Ile | Ser | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| Arg | Arg | Gln | Ile | Leu | Gln | Ala | Ala | Cys | Glu | Thr | Leu | Ser | Asn | Pro | Arg | | |
| | | 130 | | | | 135 | | | | | | 140 | | | | | |
| Ser | Arg | Arg | Glu | Tyr | Asn | Glu | Gly | Leu | Leu | Asp | Asp | Glu | Glu | Ala | Thr | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Val | Ile | Thr | Asp | Val | Pro | Trp | Asp | Lys | Val | Pro | Gly | Ala | Leu | Cys | Val | | |
| | | | | 165 | | | | | 170 | | | | | 175 | | | |
| Leu | Gln | Glu | Gly | Gly | Glu | Thr | Glu | Ile | Val | Leu | Arg | Val | Gly | Glu | Ala | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Leu | Leu | Lys | Glu | Arg | Leu | Pro | Lys | Ser | Phe | Lys | Gln | Asp | Val | Val | Leu | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Val | Met | Ala | Leu | Ala | Phe | Leu | Asp | Val | Ser | Arg | Asp | Ala | Met | Ala | Leu | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Asp | Pro | Pro | Asp | Phe | Ile | Thr | Gly | Tyr | Glu | Phe | Val | Glu | Glu | Ala | Leu | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Lys | Leu | Leu | Gln | Glu | Glu | Gly | Ala | Ser | Ser | Leu | Ala | Pro | Asp | Leu | Arg | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Ala | Gln | Ile | Asp | Glu | Thr | Leu | Glu | Glu | Ile | Thr | Pro | Arg | Tyr | Val | Leu | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Glu | Leu | Leu | Gly | Leu | Pro | Leu | Gly | Asp | Asp | Tyr | Ala | Ala | Lys | Arg | Leu | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | |
| Asn | Gly | Leu | Ser | Gly | Val | Arg | Asn | Ile | Leu | Trp | Ser | Val | Gly | Gly | Gly | | |
| | 290 | | | | | 295 | | | | | 300 | | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Ala | Ser | Ala | Leu | Val | Gly | Gly | Leu | Thr | Arg | Glu | Lys | Phe | Met | Asn | 305 | 310 | 315 | 320 |
| Glu | Ala | Phe | Leu | Arg | Met | Thr | Ala | Ala | Glu | Gln | Val | Asp | Leu | Phe | Val | 325 | 330 | 335 | |
| Ala | Thr | Pro | Ser | Asn | Ile | Pro | Ala | Glu | Ser | Phe | Glu | Val | Tyr | Glu | Val | 340 | 345 | 350 | |
| Ala | Leu | Ala | Leu | Val | Ala | Gln | Ala | Phe | Ile | Gly | Lys | Lys | Pro | His | Leu | 355 | 360 | 365 | |
| Leu | Gln | Asp | Ala | Asp | Lys | Gln | Phe | Gln | Gln | Leu | Gln | Gln | Ala | Lys | Val | 370 | 375 | 380 | |
| Met | Ala | Met | Glu | Ile | Pro | Ala | Met | Leu | Tyr | Asp | Thr | Arg | Asn | Asn | Trp | 385 | 390 | 395 | 400 |
| Glu | Ile | Asp | Phe | Gly | Leu | Glu | Arg | Gly | Leu | Cys | Ala | Leu | Leu | Ile | Gly | 405 | 410 | 415 | |
| Lys | Val | Asp | Glu | Cys | Arg | Met | Trp | Leu | Gly | Leu | Asp | Ser | Glu | Asp | Ser | 420 | 425 | 430 | |
| Gln | Tyr | Arg | Asn | Pro | Ala | Ile | Val | Glu | Phe | Val | Leu | Glu | Asn | Ser | Asn | 435 | 440 | 445 | |
| Arg | Asp | Asp | Asn | Asp | Asp | Leu | Pro | Gly | Leu | Cys | Lys | Leu | Leu | Glu | Thr | 450 | 455 | 460 | |
| Trp | Leu | Ala | Gly | Val | Val | Phe | Pro | Arg | Phe | Arg | Asp | Thr | Lys | Asp | Lys | 465 | 470 | 475 | 480 |
| Lys | Phe | Lys | Leu | Gly | Asp | Tyr | Tyr | Asp | Asp | Pro | Met | Val | Leu | Ser | Tyr | 485 | 490 | 495 | |
| Leu | Glu | Arg | Val | Glu | Val | Val | Gln | Gly | Ser | Pro | Leu | Ala | Ala | Ala | Ala | 500 | 505 | 510 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Met | Ala | Arg | Ile | Gly | Ala | Glu | His | Val | Lys | Ala | Ser | Ala | Met | Gln |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Ala | Leu | Gln | Lys | Val | Phe | Pro | Ser | Arg | Tyr | Thr | Asp | Arg | Asn | Ser | Ala |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Glu | Pro | Lys | Asp | Val | Gln | Glu | Thr | Val | Phe | Ser | Val | Asp | Pro | Val | Gly |
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| Asn | Asn | Val | Gly | Arg | Asp | Gly | Glu | Pro | Gly | Val | Phe | Ile | Ala | Glu | Ala |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Val | Arg | Pro | Ser | Glu | Asn | Phe | Glu | Thr | Asn | Asp | Tyr | Ala | Ile | Arg | Ala |
| | | | 580 | | | | | 585 | | | | | | 590 | |
| Gly | Val | Ser | Glu | Ser | Ser | Val | Asp | Glu | Thr | Thr | Val | Glu | Met | Ser | Val |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Ala | Asp | Met | Leu | Lys | Glu | Ala | Ser | Val | Lys | Ile | Leu | Ala | Ala | Gly | Val |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Ala | Ile | Gly | Leu | Ile | Ser | Leu | Phe | Ser | Gln | Lys | Tyr | Phe | Leu | Lys | Ser |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Ser | Ser | Ser | Phe | Gln | Arg | Lys | Asp | Met | Val | Ser | Ser | Met | Glu | Ser | Asp |
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| | | | 660 | | | | | 665 | | | | | | 670 | |
| Arg | Met | Asp | Ala | Arg | Thr | Ala | Glu | Asn | Ile | Val | Ser | Lys | Trp | Gln | Lys |
| | | 675 | | | | | 680 | | | | | 685 | | | |
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| Glu | Val | Leu | Asp | Gly | Arg | Met | Leu | Lys | Ile | Trp | Thr | Asp | Arg | Ala | Ala |
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Glu Thr Ala Gln Leu Gly Leu Val Tyr Asp Tyr Thr Leu Leu Lys Leu
725 730 735

Ser Val Asp Ser Val Thr Val Ser Ala Asp Gly Thr Arg Ala Leu Val
740 745 750

Glu Ala Thr Leu Glu Glu Ser Ala Cys Leu Ser Asp Leu Val His Pro
755 760 765

Glu Asn Asn Ala Thr Asp Val Arg Thr Tyr Thr Thr Arg Tyr Glu Val
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Phe Trp Ser Lys Ser Gly Trp Lys Ile Thr Glu Gly Ser Val Leu Ala
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| gtgacagtct cagcagatgg aaccctgct ctggtggaag caactctgga ggagtctgct | 2280 |
| tgtctatctg atttggttca tccagaaaac aatgctactg atgtcagaac ctacacaaca | 2340 |
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Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
 35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
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Thr Thr Thr Ala Thr Leu Val Ser Pro Pro Pro Ser Ile Asp Arg Pro
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Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
 85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
 100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
 115 120 125

Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn Pro Arg
 130 135 140

Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu Ala Thr
 145 150 155 160

Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu Cys Val
 165 170 175

Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly Glu Ala
 180 185 190

Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val Val Leu
 195 200 205

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Met | Ala | Leu | Ala | Phe | Leu | Asp | Val | Ser | Arg | Asp | Ala | Met | Ala | Leu | 210 | 215 | 220 |
| Asp | Pro | Pro | Asp | Phe | Ile | Thr | Gly | Tyr | Glu | Phe | Val | Glu | Glu | Ala | Leu | 225 | 230 | 235 |
| Lys | Leu | Leu | Gln | Glu | Glu | Gly | Ala | Ser | Ser | Leu | Ala | Pro | Asp | Leu | Arg | 245 | 250 | 255 |
| Ala | Gln | Ile | Asp | Glu | Thr | Leu | Glu | Glu | Ile | Thr | Pro | Arg | Tyr | Val | Leu | 260 | 265 | 270 |
| Glu | Leu | Leu | Gly | Leu | Pro | Leu | Gly | Asp | Asp | Tyr | Ala | Ala | Lys | Arg | Leu | 275 | 280 | 285 |
| Asn | Gly | Leu | Ser | Gly | Val | Arg | Asn | Ile | Leu | Trp | Ser | Val | Gly | Gly | Gly | 290 | 295 | 300 |
| Gly | Ala | Ser | Ala | Leu | Val | Gly | Gly | Leu | Thr | Arg | Glu | Lys | Phe | Met | Asn | 305 | 310 | 315 |
| Glu | Ala | Phe | Leu | Arg | Met | Thr | Ala | Ala | Glu | Gln | Val | Asp | Leu | Phe | Val | 325 | 330 | 335 |
| Ala | Thr | Pro | Ser | Asn | Ile | Pro | Ala | Glu | Ser | Phe | Glu | Val | Tyr | Glu | Val | 340 | 345 | 350 |
| Ala | Leu | Ala | Leu | Val | Ala | Gln | Ala | Phe | Ile | Gly | Lys | Lys | Pro | His | Leu | 355 | 360 | 365 |
| Leu | Gln | Asp | Ala | Asp | Lys | Gln | Phe | Gln | Gln | Leu | Gln | Gln | Ala | Lys | Val | 370 | 375 | 380 |
| Met | Ala | Met | Glu | Ile | Pro | Ala | Met | Leu | Tyr | Asp | Thr | Arg | Asn | Asn | Trp | 385 | 390 | 395 |
| Glu | Ile | Asp | Phe | Gly | Leu | Glu | Arg | Gly | Leu | Cys | Ala | Leu | Leu | Ile | Gly | 405 | 410 | 415 |
| Lys | Val | Asp | Glu | Cys | Arg | Met | Trp | Leu | Gly | Leu | Asp | Ser | Glu | Asp | Ser | 420 | 425 | 430 |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Gln | Tyr | Arg | Asn | Pro | Ala | Ile | Val | Glu | Phe | Val | Leu | Glu | Asn | Ser | Asn | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | |
| Arg | Asp | Asp | Asn | Asp | Asp | Leu | Pro | Gly | Leu | Cys | Lys | Leu | Leu | Glu | Thr | | |
| | 450 | | | | | 455 | | | | | 460 | | | | | | |
| Trp | Leu | Ala | Gly | Val | Val | Phe | Pro | Arg | Phe | Arg | Asp | Thr | Lys | Asp | Lys | | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | | |
| Lys | Phe | Lys | Leu | Gly | Asp | Tyr | Tyr | Asp | Asp | Pro | Met | Val | Leu | Ser | Tyr | | |
| | | | | 485 | | | | | 490 | | | | | | 495 | | |
| Leu | Glu | Arg | Val | Glu | Val | Val | Gln | Gly | Ser | Pro | Leu | Ala | Ala | Ala | Ala | | |
| | | | 500 | | | | | 505 | | | | | 510 | | | | |
| Ala | Met | Ala | Arg | Ile | Gly | Ala | Glu | His | Val | Lys | Ala | Ser | Ala | Met | Gln | | |
| | | 515 | | | | | 520 | | | | | 525 | | | | | |
| Ala | Leu | Gln | Lys | Val | Phe | Pro | Ser | Arg | Tyr | Thr | Asp | Arg | Asn | Ser | Ala | | |
| | 530 | | | | | 535 | | | | | 540 | | | | | | |
| Glu | Pro | Lys | Asp | Val | Gln | Glu | Thr | Val | Phe | Ser | Val | Asp | Pro | Val | Gly | | |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 | | |
| Asn | Asn | Val | Gly | Arg | Asp | Gly | Glu | Pro | Gly | Val | Phe | Ile | Ala | Glu | Ala | | |
| | | | 565 | | | | | | 570 | | | | | 575 | | | |
| Val | Arg | Pro | Ser | Glu | Asn | Phe | Glu | Thr | Asn | Asp | Tyr | Ala | Ile | Arg | Ala | | |
| | | | 580 | | | | | 585 | | | | | 590 | | | | |
| Gly | Val | Ser | Glu | Ser | Ser | Val | Asp | Glu | Thr | Thr | Val | Glu | Met | Ser | Val | | |
| | | 595 | | | | | 600 | | | | | 605 | | | | | |
| Ala | Asp | Met | Leu | Lys | Glu | Ala | Ser | Val | Lys | Ile | Leu | Ala | Ala | Gly | Val | | |
| | 610 | | | | | 615 | | | | | 620 | | | | | | |
| Ala | Ile | Gly | Leu | Ile | Ser | Leu | Phe | Ser | Gln | Lys | Tyr | Phe | Leu | Lys | Ser | | |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 | | |
| Ser | Ser | Ser | Phe | Gln | Arg | Lys | Asp | Met | Val | Ser | Ser | Met | Glu | Ser | Asp | | |
| | | | | 645 | | | | | 650 | | | | | 655 | | | |

Val Ala Thr Ile Gly Ser Val Arg Ala Asp Asp Ser Glu Ala Leu Pro
660 665 670

Arg Met Asp Ala Arg Thr Ala Glu Asn Ile Val Ser Lys Trp Gln Lys
675 680 685

Ile Lys Ser Leu Ala Phe Gly Pro Asp His Arg Ile Glu Met Leu Pro
690 695 700

Glu Val Leu Asp Gly Arg Met Leu Lys Ile Trp Thr Asp Arg Ala Ala
705 710 715 720

Glu Thr Ala Gln Leu Gly Leu Val Tyr Asp Tyr Thr Leu Leu Lys Leu
725 730 735

Ser Val Asp Ser Val Thr Val Ser Ala Asp Gly Thr Arg Ala Leu Val
740 745 750

Glu Ala Thr Leu Glu Glu Ser Ala Cys Leu Ser Asp Leu Val His Pro
755 760 765

Glu Asn Asn Ala Thr Asp Val Arg Thr Tyr Thr Thr Arg Tyr Glu Val
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ccgccaccac caccgccact ctggtctctc cgccaccatc tattgatcgt cccgaacgcc 360

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| acgacgcttt | aatcagccgg | agacagattc | ttcaagctgc | ttgcgaaact | ctgtctaatac | 540 |
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| ctgttgaaat | gtccgttgct | gatatgttaa | aggaggcaag | tgtgaagatc | ctagctgctg | 1980 |
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<400> 131

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Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
50 55 60

Thr Thr Thr Ala Thr Leu Val Ser Pro Pro Pro Ser Ile Asp Arg Pro
65 70 75 80

Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
115 120 125

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Arg | Gln | Ile | Leu | Gln | Ala | Ala | Cys | Glu | Thr | Leu | Ser | Asn | Pro | Arg | 130 | 135 | 140 | |
| Ser | Arg | Arg | Glu | Tyr | Asn | Glu | Gly | Leu | Leu | Asp | Asp | Glu | Glu | Ala | Thr | 145 | 150 | 155 | 160 |
| Val | Ile | Thr | Asp | Val | Pro | Trp | Asp | Lys | Val | Pro | Gly | Ala | Leu | Cys | Val | 165 | 170 | 175 | |
| Leu | Gln | Glu | Gly | Gly | Glu | Thr | Glu | Ile | Val | Leu | Arg | Val | Gly | Glu | Ala | 180 | 185 | 190 | |
| Leu | Leu | Lys | Glu | Arg | Leu | Pro | Lys | Ser | Phe | Lys | Gln | Asp | Val | Val | Leu | 195 | 200 | 205 | |
| Val | Met | Ala | Leu | Ala | Phe | Leu | Asp | Val | Ser | Arg | Asp | Ala | Met | Ala | Leu | 210 | 215 | 220 | |
| Asp | Pro | Pro | Asp | Phe | Ile | Thr | Gly | Tyr | Glu | Phe | Val | Glu | Glu | Ala | Leu | 225 | 230 | 235 | 240 |
| Lys | Leu | Leu | Gln | Glu | Glu | Gly | Ala | Ser | Ser | Leu | Ala | Pro | Asp | Leu | Arg | 245 | 250 | 255 | |
| Ala | Gln | Ile | Asp | Glu | Thr | Leu | Glu | Glu | Ile | Thr | Pro | Arg | Tyr | Val | Leu | 260 | 265 | 270 | |
| Glu | Leu | Leu | Gly | Leu | Pro | Leu | Gly | Asp | Asp | Tyr | Ala | Ala | Lys | Arg | Leu | 275 | 280 | 285 | |
| Asn | Gly | Leu | Ser | Gly | Val | Arg | Asn | Ile | Leu | Trp | Ser | Val | Gly | Gly | Gly | 290 | 295 | 300 | |
| Gly | Ala | Ser | Ala | Leu | Val | Gly | Gly | Leu | Thr | Arg | Glu | Lys | Phe | Met | Asn | 305 | 310 | 315 | 320 |
| Glu | Ala | Phe | Leu | Arg | Met | Thr | Ala | Ala | Glu | Gln | Val | Asp | Leu | Phe | Val | 325 | 330 | 335 | |
| Ala | Thr | Pro | Ser | Asn | Ile | Pro | Ala | Glu | Ser | Phe | Glu | Val | Tyr | Glu | Val | 340 | 345 | 350 | |
| Ala | Leu | Ala | Leu | Val | Ala | Gln | Ala | Phe | Ile | Gly | Lys | Lys | Pro | His | Leu | 355 | 360 | 365 | |

Leu Gln Asp Ala Asp Lys Gln Phe Gln Gln Leu Gln Gln Ala Lys Val
 370 375 380

Met Ala Met Glu Ile Pro Ala Met Leu Tyr Asp Thr Arg Asn Asn Trp
 385 390 395 400

Glu Ile Asp Phe Gly Leu Glu Arg Gly Leu Cys Ala Leu Leu Ile Gly
 405 410 415

Lys Val Asp Glu Cys Arg Met Trp Leu Gly Leu Asp Ser Glu Asp Ser
 420 425 430

Gln Tyr Arg Asn Pro Ala Ile Val Glu Phe Val Leu Glu Asn Ser Asn
 435 440 445

Arg Asp Asp Asn Asp Asp Leu Pro Gly Leu Cys Lys Leu Leu Glu Thr
 450 455 460

Trp Leu Ala Gly Val Val Phe Pro Arg Phe Arg Asp Thr Lys Asp Lys
 465 470 475 480

Lys Phe Lys Leu Gly Asp Tyr Tyr Asp Asp Pro Met Val Leu Ser Tyr
 485 490 495

Leu Glu Arg Val Glu Val Val Gln Gly Ser Pro Leu Ala Ala Ala Ala
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Ala Met Ala Arg Ile Gly Ala Glu His Val Lys Ala Ser Ala Met Gln
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Ala Leu Gln Lys Val Phe Pro Ser Arg Tyr Thr Asp Arg Asn Ser Ala
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Glu Pro Lys Asp Val Gln Glu Thr Val Phe Ser Val Asp Pro Val Gly
 545 550 555 560

Asn Asn Val Gly Arg Asp Gly Glu Pro Gly Val Phe Ile Ala Glu Ala
 565 570 575

Val Arg Pro Ser Glu Asn Phe Glu Thr Asn Asp Tyr Ala Ile Arg Ala
 580 585 590

Gly Val Ser Glu Ser Ser Val Asp Glu Thr Thr Val Glu Met Ser Val
595 600 605

Ala Asp Met Leu Lys Glu Ala Ser Val Lys Ile Leu Ala Ala Gly Val
610 615 620

Ala Ile Gly Leu Ile Ser Leu Phe Ser Gln Lys Tyr Phe Leu Lys Ser
625 630 635 640

Ser Ser Ser Phe Gln Arg Lys Asp Met Val Ser Ser Met Glu Ser Asp
645 650 655

Val Ala Thr Ile Gly Ser Val Arg Ala Asp Asp Ser Glu Ala Leu Pro
660 665 670

Arg Met Asp Ala Arg Thr Ala Glu Asn Ile Val Ser Lys Trp Gln Lys
675 680 685

Ile Lys Ser Leu Ala Phe Gly Pro Asp His Arg Ile Glu Met Leu Pro
690 695 700

Glu Val Leu Asp Gly Arg Met Leu Lys Ile Trp Thr Asp Arg Ala Ala
705 710 715 720

Glu Thr Ala Gln Leu Gly Leu Val Tyr Asp Tyr Thr Leu Leu Lys Leu
725 730 735

Ser Val Asp Ser Val Thr Val Ser Ala Asp Gly Thr Arg Ala Leu Val
740 745 750

Glu Ala Thr Leu Glu Glu Ser Ala Cys Leu Ser Asp Leu Val His Pro
755 760 765

Glu Asn Asn Ala Thr Asp Val Arg Thr Tyr Thr Thr Arg Tyr Glu Val
770 775 780

Phe Trp Ser Lys Ser Gly Trp Lys Ile Thr Glu Gly Ser Val Leu Ala
785 790 795 800

Ser

<210> 132
 <211> 561
 <212> DNA
 <213> Arabidopsis thaliana

<220>
 <221> misc_feature
 <222> (127)..(127)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (520)..(520)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (541)..(541)
 <223> n is a, c, g, or t

<400> 132
 ataaacacta acttagagag agaatttaca aaacaaagag aatctcgcaa gctcagacat 60
 gctacatatg agtatattat gatgcaagaa cagagccttc agtgattttc caccctgact 120
 tggaccngaa aacttcgtat cttgttgtgt aggttctgac atcagtagca ttgttttctg 180
 gatgaaccaa atcagataga caagcagact cctccagagt tgcttccacc agagcacggg 240
 ttccatctgc tgagactgtc aactgtcaa cagatagttt caacagtgtg taatcataaa 300
 ccaacccaag ctgctgcagtt tcagctgctc tgtcagtcca aatcttcagc attcgcccat 360
 ccaaaacctc tggtaacatt tctatgctgt gatcaggccc aaaagccaga gacttaatct 420
 tctgccactt ggatactata ttctctgcag tcttagcatc cattctggga agtgcttctg 480
 aatcgtcagc tctgactgac cctatggtag cgacatcagn ttccatagaa gaaaccatat 540
 ncttgctgtg aaaagatgag c 561

<210> 133
 <211> 295
 <212> DNA
 <213> Medicago truncatula

<400> 133
 ctgggtgtagc aattggactc ataactttag ctgggttgaa gattttacct tctaaaaatg 60
 gctcgcccggt tcttcacaaa gtgactgggt cagcaattgc gtcagatact atcaatttag 120
 gtcctgtagg agatgaagaa ttaggagagc aactaccaa aatgagtgc atgggttcag 180

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| aagctctagt | ccgcaagtgg | caatatatca | catcccaagc | ttttggacct | gaccattgcc | 240 |
| taggaagatt | gcaagaggtg | ttggacggcc | aaatgttgaa | gatatggact | gatcg | 295 |

<210> 134
 <211> 527
 <212> DNA
 <213> *Medicago truncatula*

| | |
|-------------|-----|
| <400> 134 | |
| cccaagcttt | 60 |
| tggtgaagat | 120 |
| acaacttggg | 180 |
| tagtggaac | 240 |
| ctacttccaa | 300 |
| ggaaaattat | 360 |
| gtcagggttag | 420 |
| cctgttggtt | 480 |
| atttgatcaa | 527 |

<210> 135
 <211> 660
 <212> DNA
 <213> *Medicago truncatula*

| | |
|------------|-----|
| <400> 135 | |
| cacgcttctc | 60 |
| gggcggagcg | 120 |
| ccaccacctc | 180 |
| tgctactccc | 240 |
| gtattcggag | 300 |
| aagctttgat | 360 |
| cttctagaag | 420 |
| ccattctcac | 480 |
| ctggagagac | 540 |
| agatgtttaa | 600 |
| atgctatggc | 660 |

<210> 136
 <211> 187
 <212> DNA
 <213> Glycine max

<400> 136
 agcgttggtgt gtgttgccagg aagctggaga gacggagctt gtgcttgaga ttgggcaggg 60
 tttgcttagg gagaggttgc cgaagacgtt taagcaggat gttgtgttgg ctatggcact 120
 cgcatttggt gacgtgtcaa gggatgcttg gcttgttcac cggatttcat tgcggctgtg 180
 agatgct 187

<210> 137
 <211> 608
 <212> DNA
 <213> Solanum tuberosum

<400> 137
 ggaaagcttc cttaacaatg gaggcattaa cacagctaag ctttggcatt tgtactccac 60
 gcctttcatc accatttcaa cttagccgccg ccggtggtaa gaagccgccg agactcaatg 120
 ccgttaacgg aggagctagt agtggtaccg gtggaacaag tagtttacct actaacttct 180
 ccgctagtaa atgggcggat cgtcttctcg ccgatttcca attccttcct tccaccacca 240
 cctccgactc atcggatttc cagaattcaa cttctacaac ctccggttacg actattcctc 300
 ctctgttgc tccttcagac caccacattt caatgcctat agacttttat agagtgttg 360
 gtgctgaagc tcacttcctc ggtgacggta ttaggagatg ctacgatgct agaattacaa 420
 agcctccgca gtacggatac agtcaggaag cattgattgg ccgacggcag attcttcaag 480
 ctgcttggtga aacccttgct gactctacct ctcgtagaga gtacaatcaa ggctcgcctc 540
 agcatgagtt cgatactatt ctaactcctg tcccctggga taaagttccg ggagcaatgt 600
 gtgttttg 608

<210> 138
 <211> 307
 <212> DNA
 <213> Populus balsamifera

<400> 138
 gaagatttca tgaatgaggc cttcttacgt atgacagcag ctgagcaggt tgatctgttc 60
 gtcaccacgc caagtaatat cccggctcaa aattttgaag tttatggagt ggcacttgcc 120
 cttgttgccc aagctttcat tggtaaaaag cctcatctca tcacagatgc tgataaccta 180

| | |
|---|-----|
| ttcggacagc ttcagcagat taaggtaaca aatcaaggga gtcttggtcc tgtctttggt | 240 |
| tccatggaaa accgtgatat tgactttggg ttggagaggg gctttgttca ctgctttag | 300 |
| gccagct | 307 |

<210> 139
 <211> 416
 <212> DNA
 <213> *Mesembryanthemum crystallinum*

| | |
|--|-----|
| <400> 139 | |
| gggaaacgtg ccttggtgga agcaactctt caagaatcag cgcagttaac tgacgttaac | 60 |
| caacctgagc ataacgattc ttacagcaga acatacacia caaggtacga gatgtttcac | 120 |
| tccaatgctg ggtggaagat catagagggg gctgtcctcc aatcttaagc tgctggaaat | 180 |
| ccagtcttga atgtacatat tttcacatca tctgcacatt atgaatgaag gatggatatgt | 240 |
| gttttctgga cagtgggtatt tgatcatggt gtgtttatgt ttgtaacaag ttttgatcat | 300 |
| tatcaaaaag atcactcttg taagttagtt ttttccacaa taaatcaact atttatatga | 360 |
| aagtttttat atcaggacta cttgccttta cttatataaa ctttgagaaa tttttt | 416 |

<210> 140
 <211> 465
 <212> DNA
 <213> *Oryza sativa*

<220>
 <221> misc_feature
 <222> (113)..(113)
 <223> n is a, c, g, or t

| | |
|--|-----|
| <400> 140 | |
| tggtgcttct catttgggct gctgctgctg ctattgcaaa acttggtgct caagctacag | 60 |
| ctgcacttgg tactgtgaaa tcaaatgcta ttcaagcgtt caacaagggt ttnccattga | 120 |
| tagaacagtt agacagggtca gccatggaaa atactaaaga tggccctggg ggatatcttg | 180 |
| aaaattttga ccaggaaaaat gcacctgctc atgattcgag aaatgccgcc ttgaagatta | 240 |
| tctctctggc gcactgtttg cactgttggc agtaattggg gccaaatatt tgccctcgtaa | 300 |
| gaggccccctt tctgctatta ggagtgaaga tggatctgtg gcagttgcta atagtgtcga | 360 |
| ctctactgat gatcctgcac tagatgaaga tccagtacat attcctagaa tggatgcgaa | 420 |
| gctggcagaa gatattgttc gcaagtggca gagtatcaaa tctaa | 465 |

<210> 141
 <211> 309
 <212> DNA
 <213> *Oryza sativa*

<400> 141
 atcataagaa gcgccaagaa gggcttcaag gtgcgagaaa cattttgtgg agcgttggca 60
 gaggaggtat tgctaccgtt ggaggaggat tttctcgtga agccttcatg aacgaggctt 120
 ttttgaggat gacatcaatt gaacagatgg atttcttttc aaaaacaccg aatagcattc 180
 ctctgaatg gtttgaaatt tacaatgtag cacttgcaca tgtcgctcaa gcaattataa 240
 gtaaaaggcc acaattcatc atgatggcgg atgatctttt tgaacaactc cagaagttcc 300
 acataggtc 309

<210> 142
 <211> 336
 <212> DNA
 <213> *Oryza sativa*

<400> 142
 atcataagaa gcgccaagaa gggcttcaag gtgcgagaaa cattttgtgg agcgttggca 60
 gaggaggtat tgctaccgtt ggaggaggat tttctcgtga agccttcatg aacgaggctt 120
 ttttgaggat gacatcaatt gaacagatgg atttcttttc aaaaacaccg aatagcattc 180
 ctctgaatg gtttgaaatt tacaatgtag cacttgcaca tgtcgctcaa gcaattataa 240
 gtaaaaggcc acaattcatc atgatggcgg atgatctttt tgaacaactc cagaagttca 300
 acataggttc tcattatgct tatgataatg agatgg 336

<210> 143
 <211> 537
 <212> DNA
 <213> *Triticum aestivum*

<400> 143
 cagtgttgc aattggaggg cacttactgg aggaccgccc gcccaagcgg ttcaagcagg 60
 atgtggtgct ggcaatggcg ctgcttatg tggatctatc aaggacgca atggcggcta 120
 gccctccaga tgtaatccgc tgctgtgagg tgcttgaaag ggctctcaag cttttgcagg 180
 aggatggggc aatcaatctc gcacctggtt tgctctcaca aattgatgaa actctggagg 240
 atatcacacc tcgttgtgtt ttggagcttc ttgcccttcc tcttgatgaa aaacatcaga 300
 atgaacacca agaaggtctt cgtggtgtga gaaacatttt gtggagtgtt ggagaggag 360
 gtattggtac tgttgaggga ggattttcgc gtgaagccta catgaatgaa gccttcctgc 420

agatgacatc ggcggagcag atggatttct tctcaaaaac accgaatagc ataccgcctg 480
aatggtttga aatctatagc gtggcacttg caaatgttgc tcaagcaatt gtaagta 537

<210> 144
<211> 418
<212> DNA
<213> Triticum monococcum

<220>
<221> misc_feature
<222> (144)..(144)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (301)..(301)
<223> n is a, c, g, or t

<400> 144
acacctcggt gtgttttggg gcttcttgcc ctctctcttg atgaaaagca ccagagtaaa 60
cgccaagaag gtcttcgtgg tgtgagaaac attttgtgga gtgttggttag aggaggtatt 120
gctactgttg gaggaggatt ttncgtgaa gcctacatga atgaggcctt tttgcagatg 180
acatcagcgg agcagatgga tttcttttca aaaacgcca atagcatacc acctgaatgg 240
tttgaaatct atagtgtggc actcgcaaat gttgctcaag caattgtaag taaaaggcca 300
nagctcatca tgggtggcaga tgatcttttc gaacagctcc agaagttcaa tataggttct 360
caatatgctt atgataatga attggatctt gtgttggaag gggcactttg ctcatctg 418

<210> 145
<211> 480
<212> DNA
<213> Hordeum vulgare

<400> 145
gcgagcatga gtccgtggca gttgctaatt ttgttgactc aggtgatgat gacgaaccag 60
atgagcccat acagattcct aaaatggatg cgaagctggc agaagatatt gttcgcaagt 120
ggcagagcat caaatccaag gccttgggat cagatcattc tgttgcatca ttgcaagagg 180
ttcttgatgg caacatgctg aaggatgga cggaccgagc agcagagatc gagcgcaaag 240
gctggttctg ggactacacg ctgtccaacg tggcgatcga cagcatcacc gtctccctgg 300
acggacggcg ggcgaccgtg gaggcgacaa ttgaggaggc gggtcagctc accgacgcaa 360
ccgaccccag gaacgatgat ttgtacgaca ctaagtacac caccgggtac gagatggcct 420
tcaccggacc aggagggtgg aagataaccg aaggcgcagt cctcaagtcg tcatagggcg 480

<210> 146
 <211> 622
 <212> DNA
 <213> Hordeum vulgare

<220>
 <221> misc_feature
 <222> (11)..(12)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (14)..(14)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (65)..(65)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (88)..(88)
 <223> n is a, c, g, or t

<400> 146
 gaaactctgg nngnagatca cccctcgttg tgttttagag cttcttgccc ttcctcttga 60
 cgagnaagca ccagagtaaa cgccaagnaa ggtcttcgtg gtgtgagaaa cattttgtgg 120
 agtgttggta gaggaggat tgctactggt ggtggaggat tttcacggga agcctacatg 180
 aatgaggcct ttttgcagat gacatcagct gagcagatgg atttcttttc aaaaacgccg 240
 aatagcatac cacctgaatg gtttgaaatc tatagcgtgg cactcgcaaa tgttgctcaa 300
 gcaattgtaa gtaaaaggcc agagctcatc atggtggcag atgatctttt cgaacagctc 360
 cagaagttca atatcggttc tcaatatgct tatggtaacg agatggatct tgcgttggaa 420
 agggcacttt gctcattgct tgtgggagac attagcaact gcagaacttg gcttgcgatt 480
 gataatgaat cttcaccaca tagagacccg aaaattgtag agtttattgt gaacaactct 540
 agcattgacc accaggagaa tgatcttctt ccaggcctgt gtaagctttt ggagacttgg 600
 cttgtctcag aggttttccc ta 622

<210> 147
 <211> 604
 <212> DNA
 <213> Hordeum vulgare

<220>
 <221> misc_feature
 <222> (13)..(13)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (516)..(516)
 <223> n is a, c, g, or t

<400> 147
 tggccttcacc tgnaaatcca gcactaagtt tctcttatca ccaacccaag gatctcttct 60
 agcctagcaa taatccgaat agaacacacc gaaaaacaaa gctcatcgct gactaactga 120
 ctaaccaaac tatctccgct ttccaaactg acaagagcct agactagact gcttatttac 180
 acaccagaaa aacacgggag gaatcaatca acaagggtta ctgcacgctg aacgccctat 240
 gacgacttga ggactgcgcc ttcggttata ttccaccctc ctgggccggt gaaggccatc 300
 tcgtaccggg tgggtgtactt agtgtcgta aaatcatcgt tcctgggggc gggtgcgtcg 360
 gtgagctgac ccgcctcctc aattgtcgcc tccacggctg ccgcgccgtc gtccaggag 420
 acggtgatgc tgatcgatgc cacgttgaac agcgtgtagt ccagaaacca gcctttgcgc 480
 tcaatctctg ctgctcggtc tgtccatacc ttcagnatgt tgccatcaag aacctcttgc 540
 aatgatgcaa cagaatgatc tgatcccaag gccttggatt tgatgctctg ccacttgcca 600
 acaa 604

<210> 148
 <211> 653
 <212> DNA
 <213> Sorghum bicolor

<400> 148
 tatgggtctg tggcagttgc tgactctgtt gatgggtctgg gagcagatga agagccacta 60
 gaaattccta gaatggatgc aaagttggct gaagatattg ttcgcaagtg gcaaagtatc 120
 aagtccaagg ctttggggcc agaacacact gtcacggcat tgcaagagat cctcgatggc 180
 aacatgctga aggtatggat ggaccgagcc acagagattg agcgtcacgg ttggttctgg 240
 gaatacacac tctccgacgt gacgatcgac agtatcaccg tctccatgga cggtcgacgg 300
 gcaactgtgg aggcgacgat tgaggagatg ggccaactta ccgacgtagc agacccaaag 360
 aacaacgacg cctacgacac aaagtacacc gctcggtagc agatgagcta ctccaagtcc 420
 ggaggggtgga ggatcaccga aggagcagtc ctcaagtcgt agaacggctg tgcagcagga 480
 gtaggcgagt aggggttgct caactcccat tcttttttct tttgcaccag tgtatgtaaa 540

| | |
|--|-----|
| taaacagtgt gagcacaggt tcttttctct cctggagaga gtttggtttag gttgattagt | 600 |
| gatgagttcc tgaggccgag agaatttgtc atctagtttg tattgataga gat | 653 |

<210> 149
 <211> 535
 <212> DNA
 <213> Sorghum bicolor

| | |
|---|-----|
| <400> 149 | |
| gcacgaggat agaacagcta gacagatcag gcaaggatac cccaggtgat gatcttgaga | 60 |
| aatctcttga aaaacttgcc caagaaatgt tgctggagat gctatccatg attccaaaaa | 120 |
| tgccgctttg aagattatct ctgctgggtgc actgtttgca ctatttgcag taatagggtct | 180 |
| gaagtgcttg cctcgtaaga agtcacttcc tgctcttaag agcgaatatg ggtctgtggc | 240 |
| agttgctgac tctgttgatg gtctgggagc agatgaagag ccactagaaa ttcctagaat | 300 |
| ggatgcaaag ttggctgaag atattgttcg caagtggcaa agtatcaagt ccaaggcttt | 360 |
| ggggccagaa cacactgtca cggcattgca agagatcctc gatggcaaca tgctgaaggt | 420 |
| atggatggac cgagccacag agattgagcg tcacggttgg ttctgggaat acacactctc | 480 |
| cgacgtgacg atcgacagta tcaccgtctc catggacggt cgacgggcaa ctgtg | 535 |

<210> 150
 <211> 479
 <212> DNA
 <213> Zea mays

| | |
|--|-----|
| <400> 150 | |
| gccacaggcc gccaccgcct ggccccctcca cctgccgctc cgccagccgc tgggccgacc | 60 |
| gcctcttcgc cgacttccac ctccctccccg ccgcccgcga cccgccagcc gcggcctcct | 120 |
| cttcctcctc gtccccgttc gtcccgatct tccccgaagc cgccgaccgc gccttgcccc | 180 |
| tcccggtcga cttctacaag attcttggtg cggagccaca tttcctaggc gatggcattc | 240 |
| ggagggcggt cgagtcgcgg atagctaagc cacctcagta tgggtacagc acagaagctc | 300 |
| ttgctgggcg acggcaaatg ctgcagattg cccatgatac tctcaciaac cagagctcgc | 360 |
| gcaccgagta cgaccgtgcg ctttccgagg accgtgatgc ggcactcacc atggatgttg | 420 |
| cctgggataa ggttccaggt gtgctgcgtg tgcttcagga ggctggggag gcacaactg | 479 |

<210> 151
 <211> 446
 <212> DNA
 <213> Zea mays

<400> 151
agcaatgtgg gcaagtgcga cactatagat ctcaaaccat tcaggtggta tgctattcgg 60
tgtttttagag aagaaatcca tctgctcagc tgatgtcatc tgcaagaaag cctcattcat 120
gaaggcctca cgagaaaatc ctccccaac agtagcaata ccacccctgc caacactcca 180
caatatgttt tttgcacctt gcagaccttc ttggcgttta tttttatgtt tttcatcagt 240
aggaagagca agaagctcca atacacaacg aggtgtaatc tcctccaaag tttcatcaat 300
ctgtgcaagc agttcaggtg caagattgct tgcaccatcc tcctgcagga gcttcagtgc 360
cctctcaagc acctcacaac agcagattac atctggaggg cttgctgcca tagcatccct 420
tgatatgtcc acataagcca atgcca 446

<210> 152
<211> 657
<212> DNA
<213> Zea mays

<400> 152
cgcgtcgacg tatagagtct gcatccatgt tgccttgaat gaagcgtctg caaaagaagg 60
ctcttttatc accagtcgtg tcaggaagca ttttgaaaat atatcaaaat ttctttggct 120
gagtgatagg cctaattcaa atagcaaagg aagtgataaa caccagcgg ttaatgatat 180
tactgctgca gtttgcaagc aaaagatgga tattcaagaa gcagaaacac ttgtaaaaca 240
gtggcaagac ataaaatctg aagctcttgg ccctgactat caaactgaca tgctacctga 300
gattcttgat ggttcaatgc tctctaagtg ggaagactta gcgttattag caaaggacca 360
gtcttgctat tggagatttg tgctgctaaa tcttaatgtt gttcgagccg agataatctt 420
ggatgaaata ggtgctggtg aggcagcaga aattgatgct gtacttgagg aagcggctga 480
gcttggtgac gattcccagc ccaagaaacc gagttattac agcacatatg aagttcagta 540
cgtattgagg aggcagaatc atggatcttg gaaaatctcc gaggctgctg tccgggacct 600
gacgtgattt ctgccaactc ggcaaacggg ctacacaacc attggcgtat aggcggc 657

<210> 153
<211> 871
<212> DNA
<213> Ceratopteris richardii

<400> 153
gtgggtgtctt tgctcgtgtt cctggataca caagggatga gtatatgaag gcagcttttt 60
ctcgaatgac agctgctgag caagtagctt tgttcacaaa tacacccagt aatatccag 120
cagagagttc tgaggtttac acagttgogc ttgctcacat agcagagggga tttgttgcaa 180

| | |
|--|-----|
| agaagccgca attgattcag gaagctgatt cactctttct tcagcttcag cgaacaaatg | 240 |
| cctcatcatc tagtttgcta gttactgggtg gtctacggcc attatcaagt ctgcagcttg | 300 |
| attttgcttt tgaacgagcc atgtgcaaac tgctcctagg agaactggat ggttgctgtg | 360 |
| catggctagg tttggatgat acaaactctc catatagaga ccctgcagtg actgattttg | 420 |
| ttatagctaa ttcttttgga agtgaggaag gtgattattt accaggcctt tgcaagttgt | 480 |
| tggaaagtgt gttgagggaa gcggtgtttt tccccaaccc gtcaacagaa aagtggaggt | 540 |
| acaagttgag ggagtatttt ttatgatgca aggagaaaaa aagccgccgt gaattttttc | 600 |
| gcggggggcg ctatgaaaaa atatattcaa cctttttttg ttggggcgctc gtctacaaag | 660 |
| aatgatggag tgtcattgtt gcttttgagg tgacgaaggg gcggcgctcc tctttaaggg | 720 |
| atcgtccgtg ggggcgcgcg ctcccatatc gccatcttcg ggacaccttg ttcgtgggtc | 780 |
| aaatggtgat gtctttttta ccacgaacgt cacattattc ttataatata agcgtgcggc | 840 |
| agcactctca gcttcgacga aacagcctaa a | 871 |

<210> 154
 <211> 541
 <212> DNA
 <213> *Physcomitrella patens*

| | |
|--|-----|
| <400> 154 | |
| gagaacggaa gctttagaag tggaggttgt ccccaaaatg gatgctaggt tggcggaaat | 60 |
| tatggttcga agatggcaag cagctaaagc tcgagcactt ggttctgctc atgatatggc | 120 |
| ggctcttcct gaggtgctgg agggcgagat gctgaagagc tggacagacc gtgttagtga | 180 |
| cgtcaagaga aatggttggg tttgggaata cactctcctt ggtcttcaca ttgatagtgt | 240 |
| aacagtaagt gacgatggga ggcgagcaac tgcggaagcc actttgcaag aggcagcccg | 300 |
| cttggtggac cgcaacaacc ctgaccacaa tgattcttat agaagcactt aactacgcg | 360 |
| atatgacctc cggcattggca tagatgggtg gcgaatcaat ggaggagctg tgctgcgtac | 420 |
| ttgattctga gattttcatc tccggatcat gttgacttgt aggcagatcg actagtgtga | 480 |
| acccttgcat gctacgaatg agtagtcttt ttggatattt tgatccatca tgcagctttg | 540 |
| a | 541 |

<210> 155
 <211> 2109
 <212> DNA
 <213> *Protochlorococcus marinus* MED4

<400> 155

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| gaaatattaa gggctttcca attacgcttg gataaaactc ctgatgaagg attcacgtac | 120 |
| gaggttttta ctcaaaggtc ggaattgctt cgccttactg cagatttgct tacagatcca | 180 |
| gatagtagaa gagattacga aaatttatta ctaaattggag catcagggtt agatttatct | 240 |
| tccaatagag aggttgcagg attaattctc ctttggggaat cgggctcttc taaagaagcc | 300 |
| tttaaaataa caagaaaagc attgcaaccc ccccaaactc ctgcattggg tagcagtaga | 360 |
| gaagctgata ttaccttggt agcggcttta acatctagag atgctgcaat acaagagcaa | 420 |
| gatcaaagat cttactcaaa tgctgcagat tttttacaag aaggcataca gcttcttcaa | 480 |
| agaatgggca aactagggga attacggaaa actcttgagg aggacttagt gtcgcttctt | 540 |
| ccgtatcgaa ttcttgattt gttaagtaga gatctaaatg attatgactc gcataaaaaa | 600 |
| ggtttaagta tgctggaaaa ttttaataatc aaaagagggtg gattagaagg aaaaaataaa | 660 |
| tctgaatata atgattttct aaatcagcaa gaatttgaat ctttctttca acaaataaag | 720 |
| ccattcttga ctgttcagga tcagatagat ttatttttag aattacaaaa aaggggttca | 780 |
| agtgaagcag gattttttagc ttttttatct ttaacagcaa ttggttttgc aagaagaaaa | 840 |
| cctgcaaaat tattcgaaagc tcgaaaaata ttaaaaaaac taaatttatc aggacttgac | 900 |
| tcaatgccat taatagggtg ccttgatttg ctttttagcag atgttgagca atcctcagca | 960 |
| aggtttttaa gtagttccga tgagaagtta agagattggg tgaataatta tcctggagaa | 1020 |
| aaattagaag caatatgtat tttttgtaa aattgggttag aaaatgatgt tttgggttgg | 1080 |
| tatagggata ttgatttaaa agaaatcgat ttagactctt ggtttgaaga tagagaaatc | 1140 |
| caagaattta ttgagcaaat agaaaagaag tcaaatagaa ctgtgtttta gtctgggcct | 1200 |
| caaaataaac ctatttttca agcccaagaa tctttaaaag attcaagtac gggccctgat | 1260 |
| ttaaattcgg ataattttga agaaggccga ttacctttgc ctggaggagt aagagaagat | 1320 |
| ggtcaagaag ttattgaaga aaatatttat acagatgaga ttattaaaaa caaatcaata | 1380 |
| gaattttata agtacgcaat agaaaaaatt gctgaattaa aatttgtatt tggagaagcc | 1440 |
| ttagagaact acagaatatt taataaatct tcctacctaa catatctgta tgcttttttg | 1500 |
| attttatctg cttttggcct aggtgttgga tttgtaagaa ataatctcaa aaaaccctg | 1560 |
| caggaaaaag aaataattga taactcgta tcgataaatg aaaataagaa tgtcttttat | 1620 |
| gaaggtttaa atcaagatga taaaaagaaa gttctcgata actcaaaaat tattctctca | 1680 |

gataatgcag aaaaagttat tttttcaggt gaagaaataa aaactgcttc tccctcctta 1740
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 gaaaaaatat taaaaataga tggggaattg ataaatgaaa caactttcac tccttttttg 2040
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 ggtgtttag 2109

<210> 156
 <211> 702
 <212> PRT
 <213> *Protochlorococcus marinus* MED4

<400> 156

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Ala Thr Ser Glu Glu Ile Leu Arg Ala Phe Gln Leu Arg Leu Asp Lys
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Thr Pro Asp Glu Gly Phe Thr Tyr Glu Val Leu Thr Gln Arg Ser Glu
 35 40 45

Leu Leu Arg Leu Thr Ala Asp Leu Leu Thr Asp Pro Asp Ser Arg Arg
 50 55 60

Asp Tyr Glu Asn Leu Leu Leu Asn Gly Ala Ser Gly Leu Asp Leu Ser
 65 70 75 80

Ser Asn Arg Glu Val Ala Gly Leu Ile Leu Leu Trp Glu Ser Gly Ser
 85 90 95

Ser Lys Glu Ala Phe Lys Ile Thr Arg Lys Ala Leu Gln Pro Pro Gln
 100 105 110

Thr Pro Ala Leu Gly Ser Ser Arg Glu Ala Asp Leu Thr Leu Leu Ala
 115 120 125

Ala Leu Thr Ser Arg Asp Ala Ala Ile Gln Glu Gln Asp Gln Arg Ser
 130 135 140

Tyr Ser Asn Ala Ala Asp Phe Leu Gln Glu Gly Ile Gln Leu Leu Gln
 145 150 155 160
 Arg Met Gly Lys Leu Gly Glu Leu Arg Lys Thr Leu Glu Glu Asp Leu
 165 170 175
 Val Ser Leu Leu Pro Tyr Arg Ile Leu Asp Leu Leu Ser Arg Asp Leu
 180 185 190
 Asn Asp Tyr Asp Ser His Lys Lys Gly Leu Ser Met Leu Glu Asn Leu
 195 200 205
 Ile Ile Lys Arg Gly Gly Leu Glu Gly Lys Asn Lys Ser Glu Tyr Asn
 210 215 220
 Asp Phe Leu Asn Gln Gln Glu Phe Glu Ser Phe Phe Gln Gln Ile Lys
 225 230 235 240
 Pro Phe Leu Thr Val Gln Asp Gln Ile Asp Leu Phe Leu Glu Leu Gln
 245 250 255
 Lys Arg Gly Ser Ser Glu Ala Gly Phe Leu Ala Phe Leu Ser Leu Thr
 260 265 270
 Ala Ile Gly Phe Ala Arg Arg Lys Pro Ala Lys Leu Phe Glu Ala Arg
 275 280 285
 Lys Ile Leu Lys Lys Leu Asn Leu Ser Gly Leu Asp Ser Met Pro Leu
 290 295 300
 Ile Gly Cys Leu Asp Leu Leu Leu Ala Asp Val Glu Gln Ser Ser Ala
 305 310 315 320
 Arg Phe Leu Ser Ser Ser Asp Glu Lys Leu Arg Asp Trp Leu Asn Asn
 325 330 335
 Tyr Pro Gly Glu Lys Leu Glu Ala Ile Cys Ile Phe Cys Lys Asn Trp
 340 345 350
 Leu Glu Asn Asp Val Leu Val Gly Tyr Arg Asp Ile Asp Leu Lys Glu
 355 360 365

Ile Asp Leu Asp Ser Trp Phe Glu Asp Arg Glu Ile Gln Glu Phe Ile
 370 375 380

Glu Gln Ile Glu Lys Lys Ser Asn Arg Thr Val Phe Lys Ser Gly Pro
 385 390 395 400

Gln Asn Lys Pro Ile Phe Gln Ala Gln Glu Ser Leu Lys Asp Ser Ser
 405 410 415

Thr Gly Pro Asp Leu Asn Ser Asp Asn Phe Glu Glu Gly Arg Leu Pro
 420 425 430

Leu Pro Gly Gly Val Arg Glu Asp Gly Gln Glu Val Ile Glu Glu Asn
 435 440 445

Ile Tyr Thr Asp Glu Ile Ile Lys Asn Lys Ser Ile Glu Phe Tyr Lys
 450 455 460

Tyr Ala Ile Glu Lys Ile Ala Glu Leu Lys Phe Val Phe Gly Glu Ala
 465 470 475 480

Leu Glu Asn Tyr Arg Ile Phe Asn Lys Ser Ser Tyr Leu Thr Tyr Leu
 485 490 495

Tyr Ala Phe Leu Ile Leu Phe Ala Phe Gly Leu Gly Val Gly Phe Val
 500 505 510

Arg Asn Asn Leu Lys Lys Pro Val Gln Glu Lys Glu Ile Ile Asp Asn
 515 520 525

Ser Leu Ser Ile Asn Glu Asn Lys Asn Val Phe Tyr Glu Gly Leu Asn
 530 535 540

Gln Asp Asp Lys Lys Lys Val Leu Asp Asn Ser Lys Ile Ile Leu Ser
 545 550 555 560

Asp Asn Ala Glu Lys Val Ile Phe Ser Gly Glu Glu Ile Lys Thr Ala
 565 570 575

Ser Pro Ser Leu Glu Lys Ile Glu Asn Leu Ile Asn Thr Trp Leu Val
 580 585 590

Asn Lys Ser Lys Phe Leu Ala Gly Lys Gly Glu Ile Asn Leu Ser Lys
595 600 605

Ile Val Gln Asp Asp Leu Ile Asp Arg Leu Lys Lys Glu Arg Glu Leu
610 615 620

Asp Ile Gln Lys Gly Ile Tyr Lys Asn Ile Asn Ala Asn Ile Glu Asn
625 630 635 640

Ile Val Leu Leu Thr Gln Thr Ala Ser Arg Ile Ser Val Ser Val Asp
645 650 655

Leu Lys Tyr Ser Glu Lys Ile Leu Lys Ile Asp Gly Glu Leu Ile Asn
660 665 670

Glu Thr Thr Phe Thr Pro Phe Leu Lys Val Lys Tyr Ile Leu Gly Phe
675 680 685

Ser Asn Asn Ser Trp Lys Leu Val Asp Tyr Ile Ser Gly Val
690 695 700

<210> 157
<211> 1986
<212> DNA
<213> Protochlorococcus marinus MT9313

<400> 157
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gaggtcttaa ttcagcgggc agaattgttg cggttttcag cagatttgct gactgatccg 180
ccacggcgtc aggcctatga gactgccttg ttggagctca gtcgtgatca tccaggtgag 240
accgccggtc ttgatgtgtc acctagtaga gaggtggcag ggctgatctt gctgtttgaa 300
gcgaattctt ctcatgaggt ttttcatctc gcctctcagg gattgcaacc gccccagtcc 360
ccgacgctag gtagcgaacg agaagctgac ctcgctttgt tgttggcact ggcctgtcgg 420
gctgcagccg ctgaggaaca ggaacaacgg cgttatgaag cagcagcgtc tcttctgcat 480
gacgggatcc agttgctgca gcggatgggc aagctctccg aagagtgccca caagcttgag 540
aacgatttag atgcccttct gccctatcgc attctcgact tattgagtcg ggatcttggt 600
gatcaggttt ctcaccagga aggactgcgc ctacttgaca actttgtgag ccagagagga 660
ggtcttgagg gaacggcccc atcgctgca cctgggtggc ttgatcagtc cgaatttgac 720

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gttggatttt cgcgtcggaa gcctgaacgg gtgcaggaag ctccggcagca cttagagagg      900
cttcaactgg atggatgcga cccgttgccg atgctggggt gcttggacct cttgctcgga      960
gatgtggggc gcgctcagga gcgttttctg cgcagtacag atcctcgagt gaaggactgt     1020
cttaacagcc accctggcga tgaattggct gctttttgtg agtactgccg ctcttggctg     1080
cgaggggacg tgcttcccgg ttatagggat gtggatgctg aggccgttga tctagaggct     1140
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gcttcttctt taggtaaggc cttctcagga tcgtctgtga agcaaccctt cccttgggcg     1260
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gcagctgatc agagctctga tgagtttgcc agcgatggta tggcatggat tgatcgttta     1380
gcagatctgc cacgcccgcg gcggccgggt ctgatcgggt cggttgtctt tgcggccctg     1440
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gctgctgatc agcctcaagt cacagcacct cctacagcca cactgcaaga ggaggtcctc     1560
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gtagaggtgg tgagtcgaac gccgcagcgt attgagctga atgccgttgt gacctatcgc     1860
gatcaacgcg ttgatgctgc cggcaagggt gttgaccaa cgccccaaaa agatctctcg     1920
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aaataa

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<210> 158
<211> 661
<212> PRT
<213> Protochlorococcus marinus MT9313

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<400> 158

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Val Asp Leu Pro Ile Asp His Phe Arg Leu Leu Gly Val Ser Pro Ser
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Ala Asp Ser Glu Ala Ile Leu Arg Ala Leu Glu Leu Arg Leu Asp Arg
20           25           30

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Cys Pro Asp Gln Gly Phe Thr His Glu Val Leu Ile Gln Arg Ala Glu
 35 40 45
 Leu Leu Arg Leu Ser Ala Asp Leu Leu Thr Asp Pro Pro Arg Arg Gln
 50 55 60
 Ala Tyr Glu Thr Ala Leu Leu Glu Leu Ser Arg Asp His Pro Gly Glu
 65 70 75 80
 Thr Ala Gly Leu Asp Val Ser Pro Ser Arg Glu Val Ala Gly Leu Ile
 85 90 95
 Leu Leu Phe Glu Ala Asn Ser Ser His Glu Val Phe His Leu Ala Ser
 100 105 110
 Gln Gly Leu Gln Pro Pro Gln Ser Pro Thr Leu Gly Ser Glu Arg Glu
 115 120 125
 Ala Asp Leu Ala Leu Leu Leu Ala Leu Ala Cys Arg Ala Ala Ala Ala
 130 135 140
 Glu Glu Gln Glu Gln Arg Arg Tyr Glu Ala Ala Ala Ser Leu Leu His
 145 150 155 160
 Asp Gly Ile Gln Leu Leu Gln Arg Met Gly Lys Leu Ser Glu Glu Cys
 165 170 175
 His Lys Leu Glu Asn Asp Leu Asp Ala Leu Leu Pro Tyr Arg Ile Leu
 180 185 190
 Asp Leu Leu Ser Arg Asp Leu Gly Asp Gln Val Ser His Gln Glu Gly
 195 200 205
 Leu Arg Leu Leu Asp Asn Phe Val Ser Gln Arg Gly Gly Leu Glu Gly
 210 215 220
 Thr Ala Pro Ser Pro Ala Pro Gly Gly Leu Asp Gln Ser Glu Phe Asp
 225 230 235 240
 Asn Phe Phe Lys Gln Ile Arg Lys Phe Leu Thr Val Gln Glu Gln Val
 245 250 255

Asp Leu Phe Leu Arg Trp Gln Gln Ala Gly Ser Ala Asp Ala Gly Phe
 260 265 270
 Leu Gly Gly Leu Ala Leu Ala Ala Val Gly Phe Ser Arg Arg Lys Pro
 275 280 285
 Glu Arg Val Gln Glu Ala Arg Gln His Leu Glu Arg Leu Gln Leu Asp
 290 295 300
 Gly Cys Asp Pro Leu Pro Met Leu Gly Cys Leu Asp Leu Leu Leu Gly
 305 310 315 320
 Asp Val Gly Arg Ala Gln Glu Arg Phe Leu Arg Ser Thr Asp Pro Arg
 325 330 335
 Val Lys Asp Cys Leu Asn Ser His Pro Gly Asp Glu Leu Ala Ala Phe
 340 345 350
 Cys Glu Tyr Cys Arg Ser Trp Leu Arg Gly Asp Val Leu Pro Gly Tyr
 355 360 365
 Arg Asp Val Asp Ala Glu Ala Val Asp Leu Glu Ala Trp Phe Ala Asp
 370 375 380
 Arg Asp Val Gln Ala Tyr Val Glu Arg Leu Glu Arg Ser Glu Asn Arg
 385 390 395 400
 Ala Ser Ser Leu Gly Lys Ala Phe Ser Gly Ser Ser Val Lys Gln Pro
 405 410 415
 Phe Pro Trp Ala Pro Leu Asp Pro Asp Gly Ile Leu Pro Leu Ser Leu
 420 425 430
 Gly Gly Pro Asp Val Gly Gln Pro Ala Ala Asp Gln Ser Ser Asp Glu
 435 440 445
 Phe Ala Ser Asp Gly Met Ala Trp Ile Asp Arg Leu Ala Asp Leu Pro
 450 455 460
 Arg Pro Thr Arg Pro Val Leu Ile Gly Ser Val Val Phe Ala Ala Leu
 465 470 475 480

Ile Ala Ala Phe Ala Gly Phe Ser Leu Phe Gly Gln Arg Pro Arg Thr
485 490 495

Ser Val Ser Thr Ala Ala Asp Gln Pro Gln Val Thr Ala Pro Pro Thr
500 505 510

Ala Thr Leu Gln Glu Glu Val Leu Met Pro Gln Val Pro Val Ser Ala
515 520 525

Val Val Glu Pro Leu Thr Leu Glu Gln Pro Asn Glu Ala Gln Leu Lys
530 535 540

Gly Leu Leu Gln Ala Trp Leu Ser Asn Lys Ala Val Val Leu Ala Gly
545 550 555 560

Gly Lys Ser Asp Ala Leu Pro Glu Val Ala Arg Asp Pro Leu Val Gln
565 570 575

Arg Val Ala Gln Glu Arg Ala Arg Asp Ala Ala Leu Ala Gln Thr Gln
580 585 590

Lys Val Val Ala Ser Ile Ser Ser Val Glu Val Val Ser Arg Thr Pro
595 600 605

Gln Arg Ile Glu Leu Asn Ala Val Val Thr Tyr Arg Asp Gln Arg Val
610 615 620

Asp Ala Ala Gly Lys Val Val Asp Gln Thr Pro Gln Lys Asp Leu Ser
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Val Thr Tyr Ile Leu Gly Arg Asp Pro Asp Arg Trp Arg Leu His Glu
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Tyr Ile Ser Gly Lys
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<210> 159
<211> 2151
<212> DNA
<213> Synechococcus PCC7002

<400> 159

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| caaattaccc | aagcctatcg | cgatcgccctc | tcccaatttc | cccgtcgcg | acataatgcc | 120 |
| ttggccattg | aggcccgcaa | ccggattatc | gagcaagcct | ttgaggtgtt | atcccaaaca | 180 |
| gaaacccgcg | ccgtctacga | ccatgagctg | tcgggcaata | tgtttcgttc | cctcgcccc | 240 |
| agccgtccga | aactgccttt | tcccgatcgc | ccctccagt | acacagagtt | agaagccctg | 300 |
| acagcccacc | aaccaaccat | tgacatcgcg | gaaaaagatt | tactgggggg | actgctgtta | 360 |
| ctcctcgacc | tgggggagta | cgaattagt | ctgaagtggg | ctgcccccta | cctcaagggc | 420 |
| aaaggcaagc | tgggtcaagg | agggaaattt | ggggccgctg | aaatcgtcga | gcaagaacta | 480 |
| cggttttgtt | tggccctggc | ccactgggaa | ttgagccggg | aacagtggct | ccaacaacat | 540 |
| tatgaacagg | cggtctctc | cggtcagaag | agtcaagagc | tattggtaga | tgtggcacia | 600 |
| tttgacagacc | tccaacagga | aattcaagg | gatctcaatc | gcctcagacc | ctatcaagtt | 660 |
| ctagaacttc | tggccctacc | cgaatcagaa | acccaagagc | gacaacgggg | cttacaactg | 720 |
| ctccaggaaa | tgttgagtgc | tcgctggggg | attgatggcc | agggggacga | tcagtcgggt | 780 |
| ctaagtattg | atgatttttt | gcgctttatc | cagcagttac | gcagttatct | aacggtgcaa | 840 |
| gaacagttgg | atctctttgt | ggcagaatca | aagcgacctt | cggcggcagc | ggcctaccta | 900 |
| gcggtgtatg | ctctcttggc | tgctgggttt | tcgcaacgga | aacctgacct | ggctgtgcaa | 960 |
| gcccagaccc | tattaaaacg | cctcggcaaa | cgccaggatg | ttttcttggg | gcaatcaatc | 1020 |
| tgcgccctac | tttttaggtca | gccgtcggaa | gccaatcaac | tgtagaaca | aagtcaggaa | 1080 |
| caggaggcga | tcgcctacat | tcaagagcag | tctgaggggg | caccggatct | actcccaggc | 1140 |
| ctatgtctct | acgggggaaca | gtggctgaag | acagagggtt | tttcccattt | ccgcgatctc | 1200 |
| cggcaacggc | ttgaagatgg | ctctgtttcg | ttgacggctt | acttcgccga | tcctgaagt | 1260 |
| cagcaatatc | ttgacgatct | cctcacggag | gctgtcccca | caccacacc | acatccagac | 1320 |
| acagaaagta | cagcggcccc | gtcggaaaag | ccaccggaaa | cattacagtc | agaaaccggt | 1380 |
| gtttcgccgc | atcccagtcg | tcccggcaag | gttgattcct | ttgaggatct | cgtcactcaa | 1440 |
| actcccgcct | cagttcccc | ggcaccgcct | tctcctgggt | tagcacctgt | aactgcggca | 1500 |
| ttaaaccacg | acccggaagc | gtcttctgct | tcgtcaaaat | cagtttcgtc | aaaaaagtct | 1560 |
| atcgggcctt | ggggggcgat | cgccgctatc | gtggggagtg | ttttgctggg | cgtgggcctg | 1620 |
| gtgcgaattt | tgtctggcct | aactaccacg | gaacccttac | aggtcaccct | caacggtgag | 1680 |

ccacccctaa cgatccccag cttagacacc gccgaggcaa ataataatcc ggagaatgga 1740
gcgaccgata caacgacaac gcctgcgctc aatgaggcga tcgccgctga ggtgattcaa 1800
acttggtttg agagtaaagc tagagccttt ggccaagacc gtgatttggc ggctctagaa 1860
aatatttttg cagaaccgtc cctgtcccg cggcgagta gtgcccaggc cgtccgcagc 1920
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<210> 160
<211> 716
<212> PRT
<213> Synechococcus PCC7002

<400> 160

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Ala Thr Thr Ala Gln Ile Thr Gln Ala Tyr Arg Asp Arg Leu Ser Gln
20 25 30

Phe Pro Arg Arg Glu His Asn Ala Leu Ala Ile Glu Ala Arg Asn Arg
35 40 45

Ile Ile Glu Gln Ala Phe Glu Val Leu Ser Gln Thr Glu Thr Arg Ala
50 55 60

Val Tyr Asp His Glu Leu Ser Gly Asn Met Phe Arg Ser Leu Val Pro
65 70 75 80

Ser Arg Pro Lys Leu Pro Phe Pro Asp Arg Pro Ser Ser Asp Thr Glu
85 90 95

Leu Glu Ala Leu Thr Ala His Gln Pro Thr Ile Asp Ile Ala Glu Lys
100 105 110

Asp Leu Leu Gly Gly Leu Leu Leu Leu Asp Leu Gly Glu Tyr Glu
115 120 125

Leu Val Leu Lys Trp Ala Ala Pro Tyr Leu Lys Gly Lys Gly Lys Leu
130 135 140

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Lys | Glu | Gly | Lys | Phe | Gly | Ala | Val | Glu | Ile | Val | Glu | Gln | Glu | Leu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Arg | Leu | Cys | Leu | Ala | Leu | Ala | His | Trp | Glu | Leu | Ser | Arg | Glu | Gln | Trp |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Leu | Gln | Gln | His | Tyr | Glu | Gln | Ala | Ala | Leu | Ser | Gly | Gln | Lys | Ser | Gln |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Glu | Leu | Leu | Val | Asp | Val | Ala | Gln | Phe | Ala | Asp | Leu | Gln | Gln | Glu | Ile |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Gln | Gly | Asp | Leu | Asn | Arg | Leu | Arg | Pro | Tyr | Gln | Val | Leu | Glu | Leu | Leu |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ala | Leu | Pro | Glu | Ser | Glu | Thr | Gln | Glu | Arg | Gln | Arg | Gly | Leu | Gln | Leu |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Leu | Gln | Glu | Met | Leu | Ser | Ala | Arg | Val | Gly | Ile | Asp | Gly | Gln | Gly | Asp |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Asp | Gln | Ser | Gly | Leu | Ser | Ile | Asp | Asp | Phe | Leu | Arg | Phe | Ile | Gln | Gln |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Leu | Arg | Ser | Tyr | Leu | Thr | Val | Gln | Glu | Gln | Leu | Asp | Leu | Phe | Val | Ala |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Glu | Ser | Lys | Arg | Pro | Ser | Ala | Ala | Ala | Ala | Tyr | Leu | Ala | Val | Tyr | Ala |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Leu | Leu | Ala | Ala | Gly | Phe | Ser | Gln | Arg | Lys | Pro | Asp | Leu | Val | Val | Gln |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ala | Gln | Thr | Leu | Leu | Lys | Arg | Leu | Gly | Lys | Arg | Gln | Asp | Val | Phe | Leu |
| | | | | | 325 | | | | 330 | | | | | 335 | |
| Glu | Gln | Ser | Ile | Cys | Ala | Leu | Leu | Leu | Gly | Gln | Pro | Ser | Glu | Ala | Asn |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Gln | Leu | Leu | Glu | Gln | Ser | Gln | Glu | Gln | Glu | Ala | Ile | Ala | Tyr | Ile | Gln |
| | 355 | | | | | | 360 | | | | | 365 | | | |

Glu Gln Ser Glu Gly Ala Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr
 370 375 380

Gly Glu Gln Trp Leu Lys Thr Glu Val Phe Ser His Phe Arg Asp Leu
 385 390 395 400

Arg Gln Arg Leu Glu Asp Gly Ser Val Ser Leu Thr Ala Tyr Phe Ala
 405 410 415

Asp Pro Glu Val Gln Gln Tyr Leu Asp Asp Leu Leu Thr Glu Ala Val
 420 425 430

Pro Thr Pro Thr Pro His Pro Asp Thr Glu Ser Thr Ala Ala Pro Ser
 435 440 445

Glu Lys Pro Pro Glu Thr Leu Gln Ser Glu Thr Gly Val Ser Pro His
 450 455 460

Pro Ser Arg Pro Ala Lys Val Asp Ser Phe Glu Asp Leu Val Thr Gln
 465 470 475 480

Thr Pro Ala Thr Val Pro Pro Ala Pro Pro Ser Pro Gly Val Ala Pro
 485 490 495

Val Thr Ala Ala Leu Asn Pro Asp Pro Glu Ala Ser Ser Ala Ser Ser
 500 505 510

Lys Ser Val Ser Ser Lys Lys Ser Ile Gly Pro Trp Gly Ala Ile Ala
 515 520 525

Ala Ile Val Gly Ser Val Leu Leu Val Val Gly Leu Val Arg Ile Leu
 530 535 540

Ser Gly Leu Thr Thr Gln Glu Pro Leu Gln Val Thr Leu Asn Gly Glu
 545 550 555 560

Pro Pro Leu Thr Ile Pro Ser Leu Asp Thr Ala Glu Ala Asn Asn Asn
 565 570 575

Pro Glu Asn Gly Ala Thr Asp Thr Thr Thr Pro Ala Leu Asn Glu
 580 585 590

Ala Ile Ala Ala Glu Val Ile Gln Thr Trp Phe Glu Ser Lys Ala Arg
595 600 605

Ala Phe Gly Gln Asp Arg Asp Leu Ala Ala Leu Glu Asn Ile Leu Ala
610 615 620

Glu Pro Ser Leu Ser Arg Trp Arg Ser Ser Ala Gln Ala Val Arg Ser
625 630 635 640

Ala Gly Thr Tyr Arg Thr Tyr Asp His Ser Leu Thr Ile Glu Thr Val
645 650 655

Ser Phe Asn Pro Asp Gln Pro Asn Val Ala Thr Val Glu Ala Gln Val
660 665 670

Gln Glu Lys Ala Asp Tyr Tyr Arg Ala Asn Gly Glu Arg Asp Pro Gly
675 680 685

Gln Ser Tyr Asp Ser Asp Leu Arg Val Arg Tyr Ser Leu Val Arg Gln
690 695 700

Gly Asp Arg Trp Leu Ile Arg Ser Ser Gln Thr Leu
705 710 715

<210> 161
<211> 2469
<212> DNA
<213> Synechococcus PCC7942

<400> 161
cttgccgact aaaggctaag catcgccatt ccttagatta aagcagtctg tcggcggcgc 60
tgtgccggtt aacaccagtc tgctgctgac agcgggtgcct ttctggggct tgctgtggg 120
gcgagtaacc gatcgctggg ataagagttg gtgcttctgg ctctcaagaa tagggttttc 180
cgctgcgtat tcccgatcac atccccctgt gtctgctacg gagataacgc cgatcactca 240
acagaattgg taagttgacg gtcaagttgg gatgatgaag tcgggtcaag ctggcgatcc 300
ggatctggtg ggtgttctgt gcgtattcct ctcgattact accgaattct ctgtgttggc 360
gtgcaagcct cggcagacaa acttgccgaa agctaccgcg atcgccctcaa ccaatcgccc 420
tcccatgagt ttccagagct ggcattgcag gcgcggcggc aactcctcga agcagcgatt 480
gctgagctga gtgatcccg aacagcgcgat cgctacgatc gccgcttttt tcagggcggt 540
ctggaagcga ttgaaccaag cctagaactc gaagactggc agcgaattgg agccctgctg 600

| | |
|--|------|
| atcctgctgg aattggggga atacgatcgc gtttcgcaac tggctgagga actcctgcc | 660 |
| gactacgacg cgagcgcaga agtacgcgat cagttcgcgc ggggtgatat cgccttggcg | 720 |
| atcgactat cccagcaatc cctcggtcga gaatgccgtc agcagggctc gtacgaacag | 780 |
| gccgcccagc actttggccg cagccagtct gccctagccg atcatcagcg ctttcctgaa | 840 |
| ctgagtcgaa ccctgcacca agaacaagga cagctacggc cctatcgcg tttggagcgg | 900 |
| ttggcccagc ccttgactgc cgatagcgat cgccagcagg gtttgctgtt gttgcaggcg | 960 |
| atgttggaagc accggcaggg cattgaaggc cctggggatg atggctcggg gctgaccctt | 1020 |
| gataactttt tgatgtttct ccagcaaatt cgcggctatc tgaccctggc tgaacagcag | 1080 |
| ttgctgtttg aatcgggaagc gcgtcggccc tcgccggctg cgagcttttt tgctgctac | 1140 |
| accctgattg cgcggggcctt ttgcgatcac caaccctcgt tgatccatcg cgccagcttg | 1200 |
| ctcttgcatg aactcaagag ccgcatggat gtgcacatcg aacaggcgat cgccagccta | 1260 |
| ttgctcggac agcccgaaga agctgaggcg ctactcgtcc agagccaaga tgaggaaacc | 1320 |
| ctcagccaaa tccgtgccct agcccaaggg gaagccctga tcgtcggttt gtgccgattc | 1380 |
| acggaaacct ggctagcgac caaggtatct cgggatttcc gcgacctcaa ggaaaggact | 1440 |
| gcgccgctgc agccctactt tgacgacccc gatgtccaga cctatctgga tgcgatcgtg | 1500 |
| gagttgccgt ccgatttgat gccaacgccg ctaccctgtg agccgcttga ggtgcgatcg | 1560 |
| tcgttgctgg ccaaggaact gccgaccca gcaacgcctg gtgtagctcc accccctcgc | 1620 |
| cgccgctgcc gcgatcgctc cgaacgtcct gctcgcacgg ccaaacgctt gcccttgccc | 1680 |
| tggattggtt tgggggttgt ggtggttctc ggcgggtgaa caggggtttg ggcttggcga | 1740 |
| tcgcgttcca attccacccc gccgaccccc cccccctggt ttcaaacgct gcctgaggcg | 1800 |
| gtacctgccc cttcgcccg gccagttacc gttgccctcg atcgggctca ggctgaaact | 1860 |
| gtgttgcaaa actggttggc cgctaaagct gcagccttgg ggcctcaata cgatcgcgat | 1920 |
| cgcttagcga cgggtgctgac cggtgagggt ctgcagactt ggcagggttt ttctagccag | 1980 |
| caggccaaca ccagctcac atcacagttc gatcacaagt taaccgtcga ctgagttcag | 2040 |
| ctcagtgaag gtgatcaacg agcagtagtc caagccaagg tcgatgaagt tgagcaggtc | 2100 |
| tatcgaggcg accagctgct cgaaacgcgc cgagatttgg gcttggtgat ccgctaccag | 2160 |
| ctcgtgcgcg agaacaacat ctggaaaatt gcttcgatta gtttggtgcg ctaggaattc | 2220 |
| gcaaggggtg aacccccctg ggtcttttct gtagatcccc tagagcgatc gcagaatgtt | 2280 |
| cagcgattcc tggatgtgcg cttgggcatt caagagtga tcaaaaatgt ggcgcacctt | 2340 |

gccctctttg tcgatcacat aagtgcgcg acccggaatc acaaacaggg ttttgggcac 2400
 gccatagggtt tgacggaggc gatcgctgc atcgctcagc agttggaagg gcaagttgta 2460
 tttctgggc 2469

<210> 162
 <211> 631
 <212> PRT
 <213> Synechococcus PCC7942

<400> 162

Met Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Cys Val Gly Val Gln
 1 5 10 15

Ala Ser Ala Asp Lys Leu Ala Glu Ser Tyr Arg Asp Arg Leu Asn Gln
 20 25 30

Ser Pro Ser His Glu Phe Ser Glu Leu Ala Leu Gln Ala Arg Arg Gln
 35 40 45

Leu Leu Glu Ala Ala Ile Ala Glu Leu Ser Asp Pro Glu Gln Arg Asp
 50 55 60

Arg Tyr Asp Arg Arg Phe Phe Gln Gly Gly Leu Glu Ala Ile Glu Pro
 65 70 75 80

Ser Leu Glu Leu Glu Asp Trp Gln Arg Ile Gly Ala Leu Leu Ile Leu
 85 90 95

Leu Glu Leu Gly Glu Tyr Asp Arg Val Ser Gln Leu Ala Glu Glu Leu
 100 105 110

Leu Pro Asp Tyr Asp Ala Ser Ala Glu Val Arg Asp Gln Phe Ala Arg
 115 120 125

Gly Asp Ile Ala Leu Ala Ile Ala Leu Ser Gln Gln Ser Leu Gly Arg
 130 135 140

Glu Cys Arg Gln Gln Gly Leu Tyr Glu Gln Ala Ala Gln His Phe Gly
 145 150 155 160

Arg Ser Gln Ser Ala Leu Ala Asp His Gln Arg Phe Pro Glu Leu Ser
 165 170 175

Arg Thr Leu His Gln Glu Gln Gly Gln Leu Arg Pro Tyr Arg Ile Leu
 180 185 190
 Glu Arg Leu Ala Gln Pro Leu Thr Ala Asp Ser Asp Arg Gln Gln Gly
 195 200 205
 Leu Leu Leu Leu Gln Ala Met Leu Asp Asp Arg Gln Gly Ile Glu Gly
 210 215 220
 Pro Gly Asp Asp Gly Ser Gly Leu Thr Leu Asp Asn Phe Leu Met Phe
 225 230 235 240
 Leu Gln Gln Ile Arg Gly Tyr Leu Thr Leu Ala Glu Gln Gln Leu Leu
 245 250 255
 Phe Glu Ser Glu Ala Arg Arg Pro Ser Pro Ala Ala Ser Phe Phe Ala
 260 265 270
 Cys Tyr Thr Leu Ile Ala Arg Gly Phe Cys Asp His Gln Pro Ser Leu
 275 280 285
 Ile His Arg Ala Ser Leu Leu Leu His Glu Leu Lys Ser Arg Met Asp
 290 295 300
 Val His Ile Glu Gln Ala Ile Ala Ser Leu Leu Leu Gly Gln Pro Glu
 305 310 315 320
 Glu Ala Glu Ala Leu Leu Val Gln Ser Gln Asp Glu Glu Thr Leu Ser
 325 330 335
 Gln Ile Arg Ala Leu Ala Gln Gly Glu Ala Leu Ile Val Gly Leu Cys
 340 345 350
 Arg Phe Thr Glu Thr Trp Leu Ala Thr Lys Val Phe Pro Asp Phe Arg
 355 360 365
 Asp Leu Lys Glu Arg Thr Ala Pro Leu Gln Pro Tyr Phe Asp Asp Pro
 370 375 380
 Asp Val Gln Thr Tyr Leu Asp Ala Ile Val Glu Leu Pro Ser Asp Leu
 385 390 395 400
 Met Pro Thr Pro Leu Pro Val Glu Pro Leu Glu Val Arg Ser Ser Leu
 405 410 415

Leu Ala Lys Glu Leu Pro Thr Pro Ala Thr Pro Gly Val Ala Pro Pro
420 425 430

Pro Arg Arg Arg Arg Arg Asp Arg Ser Glu Arg Pro Ala Arg Thr Ala
435 440 445

Lys Arg Leu Pro Leu Pro Trp Ile Gly Leu Gly Val Val Val Val Leu
450 455 460

Gly Gly Gly Thr Gly Val Trp Ala Trp Arg Ser Arg Ser Asn Ser Thr
465 470 475 480

Pro Pro Thr Pro Pro Pro Val Val Gln Thr Leu Pro Glu Ala Val Pro
485 490 495

Ala Pro Ser Pro Ala Pro Val Thr Val Ala Leu Asp Arg Ala Gln Ala
500 505 510

Glu Thr Val Leu Gln Asn Trp Leu Ala Ala Lys Ala Ala Ala Leu Gly
515 520 525

Pro Gln Tyr Asp Arg Asp Arg Leu Ala Thr Val Leu Thr Gly Glu Val
530 535 540

Leu Gln Thr Trp Gln Gly Phe Ser Ser Gln Gln Ala Asn Thr Gln Leu
545 550 555 560

Thr Ser Gln Phe Asp His Lys Leu Thr Val Asp Ser Val Gln Leu Ser
565 570 575

Asp Gly Asp Gln Arg Ala Val Val Gln Ala Lys Val Asp Glu Val Glu
580 585 590

Gln Val Tyr Arg Gly Asp Gln Leu Leu Glu Thr Arg Arg Asp Leu Gly
595 600 605

Leu Val Ile Arg Tyr Gln Leu Val Arg Glu Asn Asn Ile Trp Lys Ile
610 615 620

Ala Ser Ile Ser Leu Val Arg
625 630

<210> 163
 <211> 2400
 <212> DNA
 <213> Anabaena PCC7120

<400> 163
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 atttttagggc taccgttagc ggcaagtgat gaacaactgc gacaagcata cagcgatcgc 120
 attgtccaat tgccgcgacg ggagtattct caagcagcaa ttgcttccccg taaacaactt 180
 atagaagaag cttacgtggt tttatcagat ccaaaggaac gcagcagtta tgaccagctg 240
 tatcttgctc acgcctacga cccagacaac gcggctacaa ccaaagtggc agtggaaaat 300
 cgtgggggaca gcaacaatgg tcatttcgat gtccaaagcc tgagcatcga agtttcctcc 360
 gaggaattaa ttggtgcttt attaatTTTg caagagttgg gagagtatga actcgtactc 420
 aagttagggtc gtaattactt aggtaatcaa aacggcacag catccaccag aaatggcaat 480
 catcgcacgc ctgaagaatt tctcgatagt tctgaacgtc cagatattct cttgactggt 540
 gctttggcct cattagaatt agggcgggaa caatggcaac aaggccacta tgaaaacgct 600
 gctttgtctt tagagactgg gcaagaagtg ctgttttagtg aaggcatctt cccagcgtc 660
 caggcagaaa ttcaggctga tctttacaaa ttacgccctt atagaatttt agaattactt 720
 gccttacccc aggaaaaaac cattgaacgc caccaagggc tggatctatt acaaagcatc 780
 ttagacgata gcggtggcat tgatggtaca ggcaatgatc aatcaggctt aaacattgat 840
 gacttcctcc gattcatcca gcaattacgc caccacttaa cagtggctga acaacataag 900
 ttgtttgatg gtgaaagcaa acgcccttcg gctgtggcta catacttagc tgtttatgct 960
 tccatcgcca gaggattcac ccaacgccag cccgctttta ttcgatcatgc caagcaaatt 1020
 ctgatgcgtt tgtctaagcg gcaagatgtg catttagagc agtccctgtg tgcgctatta 1080
 ctagggcaaa ctgaagaagc cacgcgagtt ttagaactga gccaagaata cgaagcttta 1140
 gccttaattc gagaaaaatc tcaagattca cccgatttac tgccagggtt gtgcttatat 1200
 gccgaacaat ggctgcaaaa tgaagttttc ccccatTTcc gcgatttgct cagacagcaa 1260
 gcttcctga aagattactt tgctaataca caagtacaag cgtattttaga agccttgccc 1320
 aacgacgcgg aaaccactaa tgaatgggct gtaattaacc gccaatcggt ttctcaaccc 1380
 aggggcaatt ctactctgg aggaacgcca gtcgccaac gtcccgtagg gaaggcgaac 1440
 aggccaggag aagcgtccac aagaccagtt cccaacgta gtcattccatc agaagtaaT 1500
 cggcagtttc atcaaaacag aaccctgat cccgaattac cagaaacatc aaaccacaga 1560

agaccagagt cttcaaattt tacaactgct agagaaaata tatcgaccac agatgcttac 1620
 actgacaatt atccaccaga gatccctgta gaacgcgcca gcagacctgt tcagccgggg 1680
 gtaagtgggtt atacccaatc gaccctcca cggcaaactc ctaaacgcag gagacgcaag 1740
 aagccacagg cagttgtcaa cagaggacac agtattcatc agcaacgcca accctcacct 1800
 agcactctag gccggaaaac aagattactt tggatagttt tgggttcttt ggggtgggata 1860
 ttattgttct ggctgatagt ctcaacgact tttgggtgggt taaagaatgt attcttccca 1920
 gcaccatctt tacaagggtga gcaattatcg attcagatta gtcaaccacc tttagagatt 1980
 cctgacaaaa atgccagat acaatcccca gaggtgagtc tcacagaaga aacggcaagg 2040
 aaaataattg aaaattgggt ggctacaaa gctagtgcct taggcgctga acataaaatt 2100
 gagagttaa acgagatttt aactgggtca gcgttatctc aatggcggct aattgccttg 2160
 caagataaag cagacaatcg tcatcgagaa tacagtcata gtgtcaagggt agactccatc 2220
 agtaaactctg acatagatcc caatcgtgca agtgtggggg ctacagtcag agagttaacc 2280
 caattttatg agaatgggca aaaaggggaag tcttctgacg aaagattacg tgtacgctat 2340
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<210> 164
 <211> 798
 <212> PRT
 <213> Anabaena PCC7120

<400> 164

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Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln Leu
 20 25 30

Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu Tyr
 35 40 45

Ser Gln Ala Ala Ile Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala Tyr
 50 55 60

Val Val Leu Ser Asp Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu Tyr
 65 70 75 80

Leu Ala His Ala Tyr Asp Pro Asp Asn Ala Ala Thr Thr Lys Val Ala
 85 90 95

Ser Lys Arg Pro Ser Ala Val Ala Thr Tyr Leu Ala Val Tyr Ala Ser
 305 310 315 320

Ile Ala Arg Gly Phe Thr Gln Arg Gln Pro Ala Leu Ile Arg His Ala
 325 330 335

Lys Gln Ile Leu Met Arg Leu Ser Lys Arg Gln Asp Val His Leu Glu
 340 345 350

Gln Ser Leu Cys Ala Leu Leu Leu Gly Gln Thr Glu Glu Ala Thr Arg
 355 360 365

Val Leu Glu Leu Ser Gln Glu Tyr Glu Ala Leu Ala Leu Ile Arg Glu
 370 375 380

Lys Ser Gln Asp Ser Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr Ala
 385 390 395 400

Glu Gln Trp Leu Gln Asn Glu Val Phe Pro His Phe Arg Asp Leu Ser
 405 410 415

Arg Gln Gln Ala Ser Leu Lys Asp Tyr Phe Ala Asn Gln Gln Val Gln
 420 425 430

Ala Tyr Leu Glu Ala Leu Pro Asn Asp Ala Glu Thr Thr Asn Glu Trp
 435 440 445

Ala Val Ile Asn Arg Gln Ser Phe Ser Gln Pro Arg Gly Asn Ser Tyr
 450 455 460

Ser Gly Gly Thr Pro Val Ala Lys Arg Pro Val Gly Lys Ala Asn Arg
 465 470 475 480

Pro Gly Glu Ala Ser Thr Arg Pro Val Pro Gln Arg Ser His Pro Ser
 485 490 495

Glu Val Asn Arg Gln Phe His Gln Asn Arg Thr Pro Asp Pro Glu Leu
 500 505 510

Pro Glu Thr Ser Asn His Arg Arg Pro Glu Ser Ser Asn Phe Thr Thr
 515 520 525

Ala Arg Glu Asn Ile Ser Thr Thr Asp Ala Tyr Thr Asp Asn Tyr Pro
530 535 540

Pro Glu Ile Pro Val Glu Arg Ala Ser Arg Pro Val Gln Pro Gly Val
545 550 555 560

Ser Gly Tyr Thr Gln Ser Thr Pro Pro Arg Gln Thr Pro Lys Arg Arg
565 570 575

Arg Arg Lys Lys Pro Gln Ala Val Val Asn Arg Gly His Ser Ile His
580 585 590

Gln Gln Arg Gln Pro Ser Pro Ser Thr Leu Gly Arg Lys Thr Arg Leu
595 600 605

Leu Trp Ile Val Leu Gly Ser Leu Gly Gly Ile Leu Leu Phe Trp Leu
610 615 620

Ile Val Ser Thr Thr Phe Gly Trp Leu Lys Asn Val Phe Phe Pro Ala
625 630 635 640

Pro Ser Leu Gln Gly Glu Gln Leu Ser Ile Gln Ile Ser Gln Pro Pro
645 650 655

Leu Glu Ile Pro Asp Lys Asn Ala Gln Ile Gln Ser Pro Glu Val Ser
660 665 670

Leu Thr Glu Glu Thr Ala Arg Lys Ile Ile Glu Asn Trp Leu Ala Thr
675 680 685

Lys Ala Ser Ala Leu Gly Ala Glu His Lys Ile Glu Ser Leu Asn Glu
690 695 700

Ile Leu Thr Gly Ser Ala Leu Ser Gln Trp Arg Leu Ile Ala Leu Gln
705 710 715 720

Asp Lys Ala Asp Asn Arg His Arg Glu Tyr Ser His Ser Val Lys Val
725 730 735

Asp Ser Ile Ser Lys Ser Asp Ile Asp Pro Asn Arg Ala Ser Val Gly
740 745 750

Ala Thr Val Arg Glu Leu Thr Gln Phe Tyr Glu Asn Gly Gln Lys Gly
755 760 765

Lys Ser Ser Asp Glu Arg Leu Arg Val Arg Tyr Glu Leu Ile Arg Gln
770 775 780

Asp Asp Ile Trp Arg Ile Gln Arg Met Ser Ala Ala Ile Asn
785 790 795

<210> 165

<211> 798

<212> PRT

<213> Anabaena PCC7120

<400> 165

Met Leu Ile Thr Val Gln Gly Lys Tyr Ala Val Arg Ile Pro Leu Asp
1 5 10 15

Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln Leu
20 25 30

Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu Tyr
35 40 45

Ser Gln Ala Ala Ile Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala Tyr
50 55 60

Val Val Leu Ser Asp Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu Tyr
65 70 75 80

Leu Ala His Ala Tyr Asp Pro Asp Asn Ala Ala Thr Thr Lys Val Ala
85 90 95

Val Glu Asn Arg Gly Asp Ser Asn Asn Gly His Phe Asp Val Gln Ser
100 105 110

Leu Ser Ile Glu Val Ser Ser Glu Glu Leu Ile Gly Ala Leu Leu Ile
115 120 125

Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val Leu Lys Leu Gly Arg Asn
130 135 140

Tyr Leu Gly Asn Gln Asn Gly Thr Ala Ser Thr Arg Asn Gly Asn His
145 150 155 160

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Thr | Pro | Glu | Glu | Phe | Leu | Asp | Ser | Ser | Glu | Arg | Pro | Asp | Ile | Leu |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Leu | Thr | Val | Ala | Leu | Ala | Ser | Leu | Glu | Leu | Gly | Arg | Glu | Gln | Trp | Gln |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gln | Gly | His | Tyr | Glu | Asn | Ala | Ala | Leu | Ser | Leu | Glu | Thr | Gly | Gln | Glu |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Val | Leu | Phe | Ser | Glu | Gly | Ile | Phe | Pro | Ser | Val | Gln | Ala | Glu | Ile | Gln |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ala | Asp | Leu | Tyr | Lys | Leu | Arg | Pro | Tyr | Arg | Ile | Leu | Glu | Leu | Leu | Ala |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Leu | Pro | Gln | Glu | Lys | Thr | Ile | Glu | Arg | His | Gln | Gly | Leu | Asp | Leu | Leu |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Gln | Ser | Ile | Leu | Asp | Asp | Arg | Gly | Gly | Ile | Asp | Gly | Thr | Gly | Asn | Asp |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Gln | Ser | Gly | Leu | Asn | Ile | Asp | Asp | Phe | Leu | Arg | Phe | Ile | Gln | Gln | Leu |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Arg | His | His | Leu | Thr | Val | Ala | Glu | Gln | His | Lys | Leu | Phe | Asp | Gly | Glu |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Ser | Lys | Arg | Pro | Ser | Ala | Val | Ala | Thr | Tyr | Leu | Ala | Val | Tyr | Ala | Ser |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ile | Ala | Arg | Gly | Phe | Thr | Gln | Arg | Gln | Pro | Ala | Leu | Ile | Arg | His | Ala |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Lys | Gln | Ile | Leu | Met | Arg | Leu | Ser | Lys | Arg | Gln | Asp | Val | His | Leu | Glu |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Gln | Ser | Leu | Cys | Ala | Leu | Leu | Leu | Gly | Gln | Thr | Glu | Glu | Ala | Thr | Arg |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Val | Leu | Glu | Leu | Ser | Gln | Glu | Tyr | Glu | Ala | Leu | Ala | Leu | Ile | Arg | Glu |
| | 370 | | | | | 375 | | | | | 380 | | | | |

Lys Ser Gln Asp Ser Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr Ala
 385 390 395 400

Glu Gln Trp Leu Gln Asn Glu Val Phe Pro His Phe Arg Asp Leu Ser
 405 410 415

Arg Gln Gln Ala Ser Leu Lys Asp Tyr Phe Ala Asn Gln Gln Val Gln
 420 425 430

Ala Tyr Leu Glu Ala Leu Pro Asn Asp Ala Glu Thr Thr Asn Glu Trp
 435 440 445

Ala Val Ile Asn Arg Gln Ser Phe Ser Gln Pro Arg Gly Asn Ser Tyr
 450 455 460

Ser Gly Gly Thr Pro Val Ala Lys Arg Pro Val Gly Lys Ala Asn Arg
 465 470 475 480

Pro Gly Glu Ala Ser Thr Arg Pro Val Pro Gln Arg Ser His Pro Ser
 485 490 495

Glu Val Asn Arg Gln Phe His Gln Asn Arg Thr Pro Asp Pro Glu Leu
 500 505 510

Pro Glu Thr Ser Asn His Arg Arg Pro Glu Ser Ser Asn Phe Thr Thr
 515 520 525

Ala Arg Glu Asn Ile Ser Thr Thr Asp Ala Tyr Thr Asp Asn Tyr Pro
 530 535 540

Pro Glu Ile Pro Val Glu Arg Ala Ser Arg Pro Val Gln Pro Gly Val
 545 550 555 560

Ser Gly Tyr Thr Gln Ser Thr Pro Pro Arg Gln Thr Pro Lys Arg Arg
 565 570 575

Arg Arg Lys Lys Pro Gln Ala Val Val Asn Arg Gly His Ser Ile His
 580 585 590

Gln Gln Arg Gln Pro Ser Pro Ser Thr Leu Gly Arg Lys Thr Arg Leu
 595 600 605

Leu Trp Ile Val Leu Gly Ser Leu Gly Gly Ile Leu Leu Phe Trp Leu
610 615 620

Ile Val Ser Thr Thr Phe Gly Trp Leu Lys Asn Val Phe Phe Pro Ala
625 630 635 640

Pro Ser Leu Gln Gly Glu Gln Leu Ser Ile Gln Ile Ser Gln Pro Pro
645 650 655

Leu Glu Ile Pro Asp Lys Asn Ala Gln Ile Gln Ser Pro Glu Val Ser
660 665 670

Leu Thr Glu Glu Thr Ala Arg Lys Ile Ile Glu Asn Trp Leu Ala Thr
675 680 685

Lys Ala Ser Ala Leu Gly Ala Glu His Lys Ile Glu Ser Leu Asn Glu
690 695 700

Ile Leu Thr Gly Ser Ala Leu Ser Gln Trp Arg Leu Ile Ala Leu Gln
705 710 715 720

Asp Lys Ala Asp Asn Arg His Arg Glu Tyr Ser His Ser Val Lys Val
725 730 735

Asp Ser Ile Ser Lys Ser Asp Ile Asp Pro Asn Arg Ala Ser Val Gly
740 745 750

Ala Thr Val Arg Glu Leu Thr Gln Phe Tyr Glu Asn Gly Gln Lys Gly
755 760 765

Lys Ser Ser Asp Glu Arg Leu Arg Val Arg Tyr Glu Leu Ile Arg Gln
770 775 780

Asp Asp Ile Trp Arg Ile Gln Arg Met Ser Ala Ala Ile Asn
785 790 795

<210> 166

<211> 2307

<212> DNA

<213> Nostoc punctiforme

<400> 166

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| gtgcgaattc | cgctagatta | ctaccgaatt | ttaggactac | cgttagcggc | aagtgaagaa | 60 |
| caattgcgac | aggcatacag | cgatcgcatt | gtacaattgc | cacgacgtga | gtattctcag | 120 |
| gcagcaattt | cttctcgtaa | acaactcata | gaagaagctt | acgtgggttt | atcagatcca | 180 |
| aaacaacgca | gtacctacga | tcagctttat | cttgcccacg | cctatgaccc | tgataacctt | 240 |
| gctgctgccg | cagtagcaca | ggaaaatcgt | acagaaagca | ccaaaagggg | tagtgatacc | 300 |
| cagagtcttg | gtatagaaat | tacccaagac | gaattagttg | gcgctttatt | aattttgcaa | 360 |
| gagttgggtg | aatacgaact | tgtattgaaa | ctaggtcgtc | cgtacctagt | aaataaaaaat | 420 |
| agtgtacaaa | gttcaagaaa | aagcaataac | ttagcagatg | aagaaattta | tgaaagtgtc | 480 |
| gaacacccag | atgtcgttct | cactgttgct | cttgccctgtc | tagaattagg | tcgggaacag | 540 |
| tggcagcaag | gtcactacga | aaatgccgcc | atatccctag | aaactgggtca | agagctgcta | 600 |
| gtacgtgaag | gtttgttctc | cagtatccag | gcagaaattc | aggctgatct | ttacaaattg | 660 |
| cggccatata | gaattttgga | gttgctcgca | ttacctcaag | aaaagactgc | cgaacgaagc | 720 |
| caaggcttag | aattattgca | aaatctctta | gaagatcgtg | gcgggattga | tggcacgaac | 780 |
| aatgatgaat | cgggtttaaa | catagatgac | tttctgcgat | ttatccagca | gttacgcaac | 840 |
| cacttaacag | ttgcagaaca | gcacaagtta | tttgaagctc | aaagcaaacg | ttcttctgct | 900 |
| gttgccactt | acttagctgt | ttatgccttg | atagcgcgag | gatttgctca | acggcaacct | 960 |
| gctttaattc | gtcaagcaag | acaaatgctc | gtgcgtctgg | gcaagcgcca | agatgtacat | 1020 |
| ttagaacagt | cgctatgtgc | cttacttttg | gggcaaactg | aagaagcaac | tcgtgtttta | 1080 |
| gaacttagtc | aggagtacga | agcttttagct | tttattcggg | aaaaatctca | ggactctcca | 1140 |
| gatttgttac | cgggtctgtg | tttatatgca | gaacagtggc | tgcaacacga | agtctttccc | 1200 |
| cattttcgag | atttagcaaa | ccagcaagct | ttcctaaaag | attactttgc | taaccaacag | 1260 |
| gtgcaagctt | atttagaagc | actgccaaact | gatgccccaa | caactaatga | atgggctgta | 1320 |
| attaaccccc | agtattttcc | ccaggccaag | gcaaagaata | ctcattttca | taacaattca | 1380 |
| actaaaactt | cagcgtcatt | taatcacagc | agagtaccta | accagattt | gccagaaaca | 1440 |
| ccaacaaaag | aaacctctga | atatccaaac | ttctcaccac | ctatgtggag | ttcatctgga | 1500 |
| agtataaaaat | cagaggttcc | tgctgctgaa | aggatgagca | gaggtaacta | tcagcatttg | 1560 |
| aacggttcag | ctaagagtgc | tgcactctgt | cataacccaa | agcgtaggcg | gagaaaacct | 1620 |
| actccatctg | ctagccgaga | gcgtatacca | gataatcgtc | ctcatttctg | tcgtccccga | 1680 |

aggcggcgaa cttttgcgaa caccatagaa ggtaaaacac ggctgggtatg gagagtgttt 1740
 atttcttttg tgagcatatt agtttttttg gtattagcca caacaacttt tggatgggta 1800
 aaaaatctgt tttttcctca accttctccg cctgatctac agttgtttgt acaaataaac 1860
 caaccaccgt tacctattcc cgatccaaat agaaaaccag aatcagaaga aggcccttta 1920
 acaaatgcag aggcagaaga agttattcac acttggttat ctaccaaagc cgcagcttta 1980
 gggcccaatc atgagattaa taatttagag caaattttta ctggttcagc tttatctcaa 2040
 tggcgactga ttgctcaaca gaataagta gacaatcgct accgcaagtt cgaccatagt 2100
 ttgaagatag aatctgttga gaaaattggt ttatttgcag atcgtgccgc agtagaagct 2160
 acggtcaaag aagtgcgcga gttatatgaa aataatcagt ttaaaaactc ttctaacgat 2220
 aaattaagag ttcggtatga cttgattcga gaacgaggta aatggcgtat tcagagtaca 2280
 tctgttgtaa atcaattcac cagataa 2307

<210> 167
 <211> 768
 <212> PRT
 <213> Nostoc punctiforme

<400> 167

Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala
 1 5 10 15

Ala Ser Glu Glu Gln Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln
 20 25 30

Leu Pro Arg Arg Glu Tyr Ser Gln Ala Ala Ile Ser Ser Arg Lys Gln
 35 40 45

Leu Ile Glu Glu Ala Tyr Val Val Leu Ser Asp Pro Lys Gln Arg Ser
 50 55 60

Thr Tyr Asp Gln Leu Tyr Leu Ala His Ala Tyr Asp Pro Asp Asn Leu
 65 70 75 80

Ala Ala Ala Ala Val Ala Gln Glu Asn Arg Thr Glu Ser Thr Lys Arg
 85 90 95

Gly Ser Asp Thr Gln Ser Leu Gly Ile Glu Ile Thr Gln Asp Glu Leu
 100 105 110

Val Gly Ala Leu Leu Ile Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val
 115 120 125

Leu Lys Leu Gly Arg Pro Tyr Leu Val Asn Lys Asn Ser Ala Thr Ser
 130 135 140

Ser Arg Lys Ser Asn Asn Leu Ala Asp Glu Glu Ile Tyr Glu Ser Ala
 145 150 155 160

Glu His Pro Asp Val Val Leu Thr Val Ala Leu Ala Cys Leu Glu Leu
 165 170 175

Gly Arg Glu Gln Trp Gln Gln Gly His Tyr Glu Asn Ala Ala Ile Ser
 180 185 190

Leu Glu Thr Gly Gln Glu Leu Leu Val Arg Glu Gly Leu Phe Ser Ser
 195 200 205

Ile Gln Ala Glu Ile Gln Ala Asp Leu Tyr Lys Leu Arg Pro Tyr Arg
 210 215 220

Ile Leu Glu Leu Leu Ala Leu Pro Gln Glu Lys Thr Ala Glu Arg Ser
 225 230 235 240

Gln Gly Leu Glu Leu Leu Gln Asn Leu Leu Glu Asp Arg Gly Gly Ile
 245 250 255

Asp Gly Thr Asn Asn Asp Glu Ser Gly Leu Asn Ile Asp Asp Phe Leu
 260 265 270

Arg Phe Ile Gln Gln Leu Arg Asn His Leu Thr Val Ala Glu Gln His
 275 280 285

Lys Leu Phe Glu Ala Gln Ser Lys Arg Ser Ser Ala Val Ala Thr Tyr
 290 295 300

Leu Ala Val Tyr Ala Leu Ile Ala Arg Gly Phe Ala Gln Arg Gln Pro
 305 310 315 320

Ala Leu Ile Arg Gln Ala Arg Gln Met Leu Val Arg Leu Gly Lys Arg
 325 330 335

Gln Asp Val His Leu Glu Gln Ser Leu Cys Ala Leu Leu Leu Gly Gln
 340 345 350

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Glu | Glu | Ala | Thr | Arg | Val | Leu | Glu | Leu | Ser | Gln | Glu | Tyr | Glu | Ala | 355 | 360 | 365 | |
| Leu | Ala | Phe | Ile | Arg | Glu | Lys | Ser | Gln | Asp | Ser | Pro | Asp | Leu | Leu | Pro | 370 | 375 | 380 | |
| Gly | Leu | Cys | Leu | Tyr | Ala | Glu | Gln | Trp | Leu | Gln | His | Glu | Val | Phe | Pro | 385 | 390 | 395 | 400 |
| His | Phe | Arg | Asp | Leu | Ala | Asn | Gln | Gln | Ala | Phe | Leu | Lys | Asp | Tyr | Phe | 405 | 410 | 415 | |
| Ala | Asn | Gln | Gln | Val | Gln | Ala | Tyr | Leu | Glu | Ala | Leu | Pro | Thr | Asp | Ala | 420 | 425 | 430 | |
| Gln | Thr | Thr | Asn | Glu | Trp | Ala | Val | Ile | Asn | Pro | Gln | Tyr | Phe | Pro | Gln | 435 | 440 | 445 | |
| Ala | Lys | Ala | Lys | Asn | Thr | His | Phe | His | Asn | Asn | Ser | Thr | Lys | Thr | Ser | 450 | 455 | 460 | |
| Ala | Ser | Phe | Asn | His | Ser | Arg | Val | Pro | Asn | Pro | Asp | Leu | Pro | Glu | Thr | 465 | 470 | 475 | 480 |
| Pro | Thr | Lys | Glu | Thr | Ser | Glu | Tyr | Pro | Asn | Phe | Ser | Pro | Pro | Met | Trp | 485 | 490 | 495 | |
| Ser | Ser | Ser | Gly | Ser | Ile | Lys | Ser | Glu | Val | Pro | Ala | Ala | Glu | Arg | Met | 500 | 505 | 510 | |
| Ser | Arg | Gly | Thr | Asn | Gln | His | Leu | Asn | Gly | Ser | Ala | Lys | Ser | Ala | Ala | 515 | 520 | 525 | |
| Ser | Gly | His | Asn | Gln | Lys | Arg | Arg | Arg | Arg | Lys | Pro | Thr | Pro | Ser | Ala | 530 | 535 | 540 | |
| Ser | Arg | Glu | Arg | Ile | Pro | Asp | Asn | Arg | Pro | His | Ser | Arg | Arg | Pro | Arg | 545 | 550 | 555 | 560 |
| Arg | Arg | Arg | Thr | Phe | Ala | Asn | Thr | Ile | Glu | Gly | Lys | Thr | Arg | Leu | Val | 565 | 570 | 575 | |

Trp Arg Val Phe Ile Ser Leu Val Ser Ile Leu Val Phe Trp Val Leu
580 585 590

Ala Thr Thr Thr Phe Gly Trp Leu Lys Asn Leu Phe Phe Pro Gln Pro
595 600 605

Ser Pro Pro Asp Leu Gln Leu Phe Val Gln Ile Asn Gln Pro Pro Leu
610 615 620

Pro Ile Pro Asp Pro Asn Arg Lys Pro Glu Ser Glu Glu Gly Pro Leu
625 630 635 640

Thr Asn Ala Glu Ala Glu Glu Val Ile His Thr Trp Leu Ser Thr Lys
645 650 655

Ala Ala Ala Leu Gly Pro Asn His Glu Ile Asn Asn Leu Glu Gln Ile
660 665 670

Leu Thr Gly Ser Ala Leu Ser Gln Trp Arg Leu Ile Ala Gln Gln Asn
675 680 685

Lys Leu Asp Asn Arg Tyr Arg Lys Phe Asp His Ser Leu Lys Ile Glu
690 695 700

Ser Val Glu Lys Ile Gly Leu Phe Ala Asp Arg Ala Ala Val Glu Ala
705 710 715 720

Thr Val Lys Glu Val Thr Gln Leu Tyr Glu Asn Asn Gln Phe Lys Asn
725 730 735

Ser Ser Asn Asp Lys Leu Arg Val Arg Tyr Asp Leu Ile Arg Glu Arg
740 745 750

Gly Lys Trp Arg Ile Gln Ser Thr Ser Val Val Asn Gln Phe Thr Arg
755 760 765

<210> 168

<211> 2145

<212> DNA

<213> Synechocystis PCC6803

<400> 168

gtgttttatcc ccctcgactt ttatcgtatt ttaggcattc ctccccagag tgggtggggaa 60

accattgagc aggcctacca agatcgcctt ttacaattac cccggcgaga atttagtgac 120

| | |
|---|------|
| gccgcagtta ctctccgcaa tcaattactg gcgatcgccct atgaaaccct gagggatccg | 180 |
| gaaaaacgtc aggcatacga ccaagaatgg tggggagcca tggatgaagc cctgggggag | 240 |
| gccttaccctc tcaactaccct ggagttggaa tgtagcccag agcaagaaat tggagccctg | 300 |
| ttgatcctgt tggatttggg ggaatacga ctcgtgggta agtatgggtga gccagtactc | 360 |
| cacgatccca accctccggc gggaggcctg cccaggact atttgctttc ggtaattttg | 420 |
| gcccactggg aactgagccg ggaacgttgg caacaacagc agtatgaatt tgccgccacc | 480 |
| gccagtctta aggccctagc tcggttgcaa caggataatg acttccccgc cttggaagca | 540 |
| gaaattcgtc aggaactata ccgtctgcga ccctaccgta tcctcgaact tttggctaag | 600 |
| gaggggcaag gggaggagca acgtcagcag ggtctagctc tggtgcaagc gatggtgcag | 660 |
| gaccggggcg gcattgaagg taagggggaa gattattccg gattgggaaa tgatgacttt | 720 |
| ctaaaattca tccaccaact acgctgtcac ctcacagtgg ccgagcaaaa cgccctattt | 780 |
| ttgcccgaag gtcaacggcc atcttttagta gcaagctatt tggcagtaca tagtctgatg | 840 |
| gctgagggag tgaaggaaca ggaccccatg gccattgtcg aagcaaaatc tttgattata | 900 |
| cagttggaaa attgtcaaga tttggcccta gaaaaggtaa tttgtgaatt attattgggt | 960 |
| caaacggaag ttgttctggc ggcgatcgac caggagatc cgaaaatagt agctggcctc | 1020 |
| gaatctaagt tagcgacggg ggaagacccc ttaactgctt tttatacttt cactgagcag | 1080 |
| tggctagagg aagaaattgt cccctacttt agggatcttt ctccggagac cctttccccc | 1140 |
| aaggcctatt tcaataatcc ctccgttcag cagtatctag aacaactaga gccggattcc | 1200 |
| ttcaccactg acaattcttt tgccctccct gccctcctta gcaccgcaac ggaatcggaa | 1260 |
| actcccatgg tacatagttc cgccgccctt cccgatcgcc ctttgacctc caccgttccc | 1320 |
| tcacgacggg gacgcagtcc aagacgttcc cgagacgatg ttttccccag cgccgacaat | 1380 |
| tccagtgggt tggccgtcac caccctatct ccggcgatcg cctacgacac ccactccttg | 1440 |
| ggcaccaacg gtattggcgg ggatagcact agcaacgggt tttccagtaa ctccgcccc | 1500 |
| gaatccacca gtaaacataa atctccccgg cgacgcaaaa aacgggtgac catcaagccg | 1560 |
| gtgcgcttcg gcatttttct gctttgccta gcaggcattg tggggggggc aactgcccta | 1620 |
| attatcaatc gtactggcga tcccctaggt ggggtgctag aagaccccct agatgttttc | 1680 |
| ctggaccaac cttcagaatt tatccccgat gaagccacga gccggaattt gattctcagt | 1740 |
| caacccaact tcaatcagca agtgggtcag atggtagtac aaggctggct tgatagtaaa | 1800 |
| aagttagcct ttggccaaaa ctacgatgtc ggggcattgc agagtgtttt agccccaat | 1860 |

ctccttgccc aacaacgggg tcgggccc aa cgggatcaag cccaaaaggt ctatcaccaa 1920
 tacgaacaca agttgcagat tttagcctat caagttaacc cccaagaccc caaccgagcc 1980
 accgttactg cccgggtaga agaaattagc cagcccttta ccctaggtaa tcaacagcag 2040
 aagggctccg ccaccaaaga tgacttgact gtgcgctatc agctagtacg acaccaaggg 2100
 gtttgga aaa ttgaccaa at acaagtggta aatggccccc gttag 2145

<210> 169
 <211> 714
 <212> PRT
 <213> Synechocystis PCC6803

<400> 169

Met Phe Ile Pro Leu Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln
 1 5 10 15

Ser Gly Gly Glu Thr Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln
 20 25 30

Leu Pro Arg Arg Glu Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln
 35 40 45

Leu Leu Ala Ile Ala Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln
 50 55 60

Ala Tyr Asp Gln Glu Trp Trp Gly Ala Met Asp Glu Ala Leu Gly Glu
 65 70 75 80

Ala Leu Pro Leu Thr Thr Pro Glu Leu Glu Cys Ser Pro Glu Gln Glu
 85 90 95

Ile Gly Ala Leu Leu Ile Leu Leu Asp Leu Gly Glu Tyr Glu Leu Val
 100 105 110

Val Lys Tyr Gly Glu Pro Val Leu His Asp Pro Asn Pro Pro Ala Gly
 115 120 125

Gly Leu Pro Gln Asp Tyr Leu Leu Ser Val Ile Leu Ala His Trp Glu
 130 135 140

Leu Ser Arg Glu Arg Trp Gln Gln Gln Tyr Glu Phe Ala Ala Thr
 145 150 155 160

Ala Ser Leu Lys Ala Leu Ala Arg Leu Gln Gln Asp Asn Asp Phe Pro
 165 170 175
 Ala Leu Glu Ala Glu Ile Arg Gln Glu Leu Tyr Arg Leu Arg Pro Tyr
 180 185 190
 Arg Ile Leu Glu Leu Leu Ala Lys Glu Gly Gln Gly Glu Glu Gln Arg
 195 200 205
 Gln Gln Gly Leu Ala Leu Leu Gln Ala Met Val Gln Asp Arg Gly Gly
 210 215 220
 Ile Glu Gly Lys Gly Glu Asp Tyr Ser Gly Leu Gly Asn Asp Asp Phe
 225 230 235 240
 Leu Lys Phe Ile His Gln Leu Arg Cys His Leu Thr Val Ala Glu Gln
 245 250 255
 Asn Ala Leu Phe Leu Pro Glu Ser Gln Arg Pro Ser Leu Val Ala Ser
 260 265 270
 Tyr Leu Ala Val His Ser Leu Met Ala Glu Gly Val Lys Glu Gln Asp
 275 280 285
 Pro Met Ala Ile Val Glu Ala Lys Ser Leu Ile Ile Gln Leu Glu Asn
 290 295 300
 Cys Gln Asp Leu Ala Leu Glu Lys Val Ile Cys Glu Leu Leu Leu Gly
 305 310 315 320
 Gln Thr Glu Val Val Leu Ala Ala Ile Asp Gln Gly Asp Pro Lys Ile
 325 330 335
 Val Ala Gly Leu Glu Ser Lys Leu Ala Thr Gly Glu Asp Pro Leu Thr
 340 345 350
 Ala Phe Tyr Thr Phe Thr Glu Gln Trp Leu Glu Glu Glu Ile Val Pro
 355 360 365
 Tyr Phe Arg Asp Leu Ser Pro Glu Thr Leu Ser Pro Lys Ala Tyr Phe
 370 375 380
 Asn Asn Pro Ser Val Gln Gln Tyr Leu Glu Gln Leu Glu Pro Asp Ser
 385 390 395 400

Phe Thr Thr Asp Asn Ser Phe Ala Ser Pro Ala Leu Leu Ser Thr Ala
405 410 415
Thr Glu Ser Glu Thr Pro Met Val His Ser Ser Ala Ala Leu Pro Asp
420 425 430
Arg Pro Leu Thr Ser Thr Val Pro Ser Arg Arg Gly Arg Ser Pro Arg
435 440 445
Arg Ser Arg Asp Asp Val Phe Pro Ser Ala Asp Asn Ser Ser Gly Leu
450 455 460
Ala Val Thr Thr Leu Ser Pro Ala Ile Ala Tyr Asp Thr His Ser Leu
465 470 475 480
Gly Thr Asn Gly Ile Gly Gly Asp Ser Thr Ser Asn Gly Phe Ser Ser
485 490 495
Asn Ser Ala Pro Glu Ser Thr Ser Lys His Lys Ser Pro Arg Arg Arg
500 505 510
Lys Lys Arg Val Thr Ile Lys Pro Val Arg Phe Gly Ile Phe Leu Leu
515 520 525
Cys Leu Ala Gly Ile Val Gly Gly Ala Thr Ala Leu Ile Ile Asn Arg
530 535 540
Thr Gly Asp Pro Leu Gly Gly Leu Leu Glu Asp Pro Leu Asp Val Phe
545 550 555 560
Leu Asp Gln Pro Ser Glu Phe Ile Pro Asp Glu Ala Thr Ser Arg Asn
565 570 575
Leu Ile Leu Ser Gln Pro Asn Phe Asn Gln Gln Val Gly Gln Met Val
580 585 590
Val Gln Gly Trp Leu Asp Ser Lys Lys Leu Ala Phe Gly Gln Asn Tyr
595 600 605

Asp Val Gly Ala Leu Gln Ser Val Leu Ala Pro Asn Leu Leu Ala Gln
610 615 620

Gln Arg Gly Arg Ala Gln Arg Asp Gln Ala Gln Lys Val Tyr His Gln
625 630 635 640

Tyr Glu His Lys Leu Gln Ile Leu Ala Tyr Gln Val Asn Pro Gln Asp
645 650 655

Pro Asn Arg Ala Thr Val Thr Ala Arg Val Glu Glu Ile Ser Gln Pro
660 665 670

Phe Thr Leu Gly Asn Gln Gln Gln Lys Gly Ser Ala Thr Lys Asp Asp
675 680 685

Leu Thr Val Arg Tyr Gln Leu Val Arg His Gln Gly Val Trp Lys Ile
690 695 700

Asp Gln Ile Gln Val Val Asn Gly Pro Arg
705 710

<210> 170

<211> 714

<212> PRT

<213> Synechocystis PCC6803

<400> 170

Met Phe Ile Pro Leu Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln
1 5 10 15

Ser Gly Gly Glu Thr Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln
20 25 30

Leu Pro Arg Arg Glu Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln
35 40 45

Leu Leu Ala Ile Ala Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln
50 55 60

Ala Tyr Asp Gln Glu Trp Trp Gly Ala Met Asp Glu Ala Leu Gly Glu
65 70 75 80

Ala Leu Pro Leu Thr Thr Pro Glu Leu Glu Cys Ser Pro Glu Gln Glu
85 90 95

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Gly | Ala | Leu | Leu | Ile | Leu | Leu | Asp | Leu | Gly | Glu | Tyr | Glu | Leu | Val | 100 | 105 | 110 | |
| Val | Lys | Tyr | Gly | Glu | Pro | Val | Leu | His | Asp | Pro | Asn | Pro | Pro | Ala | Gly | 115 | 120 | 125 | |
| Gly | Leu | Pro | Gln | Asp | Tyr | Leu | Leu | Ser | Val | Ile | Leu | Ala | His | Trp | Glu | 130 | 135 | 140 | |
| Leu | Ser | Arg | Glu | Arg | Trp | Gln | Gln | Gln | Gln | Tyr | Glu | Phe | Ala | Ala | Thr | 145 | 150 | 155 | 160 |
| Ala | Ser | Leu | Lys | Ala | Leu | Ala | Arg | Leu | Gln | Gln | Asp | Asn | Asp | Phe | Pro | 165 | 170 | 175 | |
| Ala | Leu | Glu | Ala | Glu | Ile | Arg | Gln | Glu | Leu | Tyr | Arg | Leu | Arg | Pro | Tyr | 180 | 185 | 190 | |
| Arg | Ile | Leu | Glu | Leu | Leu | Ala | Lys | Glu | Gly | Gln | Gly | Glu | Glu | Gln | Arg | 195 | 200 | 205 | |
| Gln | Gln | Gly | Leu | Ala | Leu | Leu | Gln | Ala | Met | Val | Gln | Asp | Arg | Gly | Gly | 210 | 215 | 220 | |
| Ile | Glu | Gly | Lys | Gly | Glu | Asp | Tyr | Ser | Gly | Leu | Gly | Asn | Asp | Asp | Phe | 225 | 230 | 235 | 240 |
| Leu | Lys | Phe | Ile | His | Gln | Leu | Arg | Cys | His | Leu | Thr | Val | Ala | Glu | Gln | 245 | 250 | 255 | |
| Asn | Ala | Leu | Phe | Leu | Pro | Glu | Ser | Gln | Arg | Pro | Ser | Leu | Val | Ala | Ser | 260 | 265 | 270 | |
| Tyr | Leu | Ala | Val | His | Ser | Leu | Met | Ala | Glu | Gly | Val | Lys | Glu | Gln | Asp | 275 | 280 | 285 | |
| Pro | Met | Ala | Ile | Val | Glu | Ala | Lys | Ser | Leu | Ile | Ile | Gln | Leu | Glu | Asn | 290 | 295 | 300 | |
| Cys | Gln | Asp | Leu | Ala | Leu | Glu | Lys | Val | Ile | Cys | Glu | Leu | Leu | Leu | Gly | 305 | 310 | 315 | 320 |

Gln Thr Glu Val Val Leu Ala Ala Ile Asp Gln Gly Asp Pro Lys Ile
 325 330 335

Val Ala Gly Leu Glu Ser Lys Leu Ala Thr Gly Glu Asp Pro Leu Thr
 340 345 350

Ala Phe Tyr Thr Phe Thr Glu Gln Trp Leu Glu Glu Glu Ile Val Pro
 355 360 365

Tyr Phe Arg Asp Leu Ser Pro Glu Thr Leu Ser Pro Lys Ala Tyr Phe
 370 375 380

Asn Asn Pro Ser Val Gln Gln Tyr Leu Glu Gln Leu Glu Pro Asp Ser
 385 390 395 400

Phe Thr Thr Asp Asn Ser Phe Ala Ser Pro Ala Leu Leu Ser Thr Ala
 405 410 415

Thr Glu Ser Glu Thr Pro Met Val His Ser Ser Ala Ala Leu Pro Asp
 420 425 430

Arg Pro Leu Thr Ser Thr Val Pro Ser Arg Arg Gly Arg Ser Pro Arg
 435 440 445

Arg Ser Arg Asp Asp Val Phe Pro Ser Ala Asp Asn Ser Ser Gly Leu
 450 455 460

Ala Val Thr Thr Leu Ser Pro Ala Ile Ala Tyr Asp Thr His Ser Leu
 465 470 475 480

Gly Thr Asn Gly Ile Gly Gly Asp Ser Thr Ser Asn Gly Phe Ser Ser
 485 490 495

Asn Ser Ala Pro Glu Ser Thr Ser Lys His Lys Ser Pro Arg Arg Arg
 500 505 510

Lys Lys Arg Val Thr Ile Lys Pro Val Arg Phe Gly Ile Phe Leu Leu
 515 520 525

Cys Leu Ala Gly Ile Val Gly Gly Ala Thr Ala Leu Ile Ile Asn Arg
 530 535 540

Thr Gly Asp Pro Leu Gly Gly Leu Leu Glu Asp Pro Leu Asp Val Phe
 545 550 555 560

Leu Asp Gln Pro Ser Glu Phe Ile Pro Asp Glu Ala Thr Ser Arg Asn
 565 570 575

Leu Ile Leu Ser Gln Pro Asn Phe Asn Gln Gln Val Gly Gln Met Val
 580 585 590

Val Gln Gly Trp Leu Asp Ser Lys Lys Leu Ala Phe Gly Gln Asn Tyr
 595 600 605

Asp Val Gly Ala Leu Gln Ser Val Leu Ala Pro Asn Leu Leu Ala Gln
 610 615 620

Gln Arg Gly Arg Ala Gln Arg Asp Gln Ala Gln Lys Val Tyr His Gln
 625 630 635 640

Tyr Glu His Lys Leu Gln Ile Leu Ala Tyr Gln Val Asn Pro Gln Asp
 645 650 655

Pro Asn Arg Ala Thr Val Thr Ala Arg Val Glu Glu Ile Ser Gln Pro
 660 665 670

Phe Thr Leu Gly Asn Gln Gln Gln Lys Gly Ser Ala Thr Lys Asp Asp
 675 680 685

Leu Thr Val Arg Tyr Gln Leu Val Arg His Gln Gly Val Trp Lys Ile
 690 695 700

Asp Gln Ile Gln Val Val Asn Gly Pro Arg
 705 710

<210> 171
 <211> 819
 <212> PRT
 <213> Arabidopsis thaliana

<400> 171

Met Pro Val Ala Tyr Thr Phe Pro Val Leu Pro Ser Ser Cys Leu Leu
 1 5 10 15

Cys Gly Ile Ser Asn Arg Ser Thr Ser Phe Val Val Asp Arg Pro Glu
 20 25 30

Leu Gln Ile Ser Gly Leu Leu Val Val Arg Ser Glu Ser Gly Glu Phe
 35 40 45
 Phe Gly Ser Gly Leu Ser Leu Arg Arg Phe Gln Arg Glu Gly Arg Arg
 50 55 60
 Arg Leu Asn Ala Ala Gly Gly Gly Ile His Val Val Asp Asn Ala Pro
 65 70 75 80
 Ser Arg Thr Ser Ser Leu Ala Ala Ser Thr Ser Thr Ile Glu Leu Pro
 85 90 95
 Val Thr Cys Tyr Gln Leu Ile Gly Val Ser Glu Gln Ala Glu Lys Asp
 100 105 110
 Glu Val Val Lys Ser Val Ile Asn Leu Lys Lys Thr Asp Ala Glu Glu
 115 120 125
 Gly Tyr Thr Met Glu Ala Ala Ala Ala Arg Gln Asp Leu Leu Met Asp
 130 135 140
 Val Arg Asp Lys Leu Leu Phe Glu Ser Glu Tyr Ala Gly Asn Leu Lys
 145 150 155 160
 Glu Lys Ile Ala Pro Lys Ser Pro Leu Arg Ile Pro Trp Ala Trp Leu
 165 170 175
 Pro Gly Ala Leu Cys Leu Leu Gln Glu Val Gly Gln Glu Lys Leu Val
 180 185 190
 Leu Asp Ile Gly Arg Ala Ala Leu Arg Asn Leu Asp Ser Lys Pro Tyr
 195 200 205
 Ile His Asp Ile Phe Leu Ser Met Ala Leu Ala Glu Cys Ala Ile Ala
 210 215 220
 Lys Ala Ala Phe Glu Val Asn Lys Val Ser Gln Gly Phe Glu Ala Leu
 225 230 235 240
 Ala Arg Ala Gln Ser Phe Leu Lys Ser Lys Val Thr Leu Gly Lys Leu
 245 250 255

Ala Leu Leu Thr Gln Ile Glu Glu Ser Leu Glu Gly Leu Ala Pro Pro
 260 265 270

Cys Thr Leu Asp Leu Leu Gly Leu Pro Arg Thr Pro Glu Asn Ala Glu
 275 280 285

Arg Arg Arg Gly Ala Ile Ala Ala Leu Arg Glu Leu Leu Arg Gln Gly
 290 295 300

Leu Ser Val Glu Ala Ser Cys Gln Ile Gln Asp Trp Pro Cys Phe Leu
 305 310 315 320

Ser Gln Ala Ile Ser Arg Leu Leu Ala Thr Glu Ile Val Asp Leu Leu
 325 330 335

Pro Trp Asp Asp Leu Ala Ile Thr Arg Lys Asn Lys Lys Ser Leu Glu
 340 345 350

Ser His Asn Gln Arg Val Val Ile Asp Phe Asn Cys Phe Tyr Met Val
 355 360 365

Leu Leu Gly His Ile Ala Val Gly Phe Ser Gly Lys Gln Asn Glu Thr
 370 375 380

Ile Asn Lys Ala Lys Thr Ile Cys Glu Cys Leu Ile Ala Ser Glu Gly
 385 390 395 400

Val Asp Leu Lys Phe Glu Glu Ala Phe Cys Ser Phe Leu Leu Lys Gln
 405 410 415

Gly Ser Glu Ala Glu Ala Leu Glu Lys Leu Lys Gln Leu Glu Ser Asn
 420 425 430

Ser Asp Ser Ala Val Arg Asn Ser Ile Leu Gly Lys Glu Ser Arg Ser
 435 440 445

Thr Ser Ala Thr Pro Ser Leu Glu Ala Trp Leu Met Glu Ser Val Leu
 450 455 460

Ala Asn Phe Pro Asp Thr Arg Gly Cys Ser Pro Ser Leu Ala Asn Phe
 465 470 475 480

Phe Arg Ala Glu Lys Lys Tyr Pro Glu Asn Lys Lys Met Gly Ser Pro
 485 490 495

Ser Ile Met Asn His Lys Thr Asn Gln Arg Pro Leu Ser Thr Thr Gln
 500 505 510

Phe Val Asn Ser Ser Gln His Leu Tyr Thr Ala Val Glu Gln Leu Thr
 515 520 525

Pro Thr Asp Leu Gln Ser Pro Val Val Ser Ala Lys Asn Asn Asp Glu
 530 535 540

Thr Ser Ala Ser Met Pro Ser Val Gln Leu Lys Arg Asn Leu Gly Val
 545 550 555 560

His Lys Asn Lys Ile Trp Asp Glu Trp Leu Ser Gln Ser Ser Leu Ile
 565 570 575

Gly Arg Val Ser Val Val Ala Leu Leu Gly Cys Thr Val Phe Phe Ser
 580 585 590

Leu Lys Leu Ser Gly Ile Arg Ser Gly Arg Leu Gln Ser Met Pro Ile
 595 600 605

Ser Val Ser Ala Arg Pro His Ser Glu Ser Asp Ser Phe Leu Trp Lys
 610 615 620

Thr Glu Ser Gly Asn Phe Arg Lys Asn Leu Asp Ser Val Asn Arg Asn
 625 630 635 640

Gly Ile Val Gly Asn Ile Lys Val Leu Ile Asp Met Leu Lys Met His
 645 650 655

Cys Gly Glu His Pro Asp Ala Leu Tyr Leu Lys Ser Ser Gly Gln Ser
 660 665 670

Ala Thr Ser Leu Ser His Ser Ala Ser Glu Leu His Lys Arg Pro Met
 675 680 685

Asp Thr Glu Glu Ala Glu Glu Leu Val Arg Gln Trp Glu Asn Val Lys
 690 695 700

Ala Glu Ala Leu Gly Pro Thr His Gln Val Tyr Ser Leu Ser Glu Val
 705 710 715 720

Leu Asp Glu Ser Met Leu Val Gln Trp Gln Thr Leu Ala Gln Thr Ala
 725 730 735

Glu Ala Lys Ser Cys Tyr Trp Arg Phe Val Leu Leu His Leu Glu Val
 740 745 750

Leu Gln Ala His Ile Phe Glu Asp Gly Ile Ala Gly Glu Ala Ala Glu
 755 760 765

Ile Glu Ala Leu Leu Glu Glu Ala Ala Glu Leu Val Asp Glu Ser Gln
 770 775 780

Pro Lys Asn Ala Lys Tyr Tyr Ser Thr Tyr Lys Ile Arg Tyr Ile Leu
 785 790 795 800

Lys Lys Gln Glu Asp Gly Leu Trp Lys Phe Cys Gln Ser Asp Ile Gln
 805 810 815

Ile Gln Lys

<210> 172
 <211> 2857
 <212> DNA
 <213> Arabidopsis thaliana

<400> 172
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 ggagctgttg cgcaatgcc gtagcttaca catttccagt tctcccttct tcttgtctgc 180
 tttgcggaat ctccaatcgc agcaccagct tcgtcgtaga tcgcccggag cttcagatct 240
 caggtctcct cgtcgttcgt tctgaatccg gtgaattctt cggttctggt ttatctttgc 300
 ggcggtttca gcgagaagga cggaggaggt tgaatgctgc tgggtggtggt atccatgtcg 360
 tcgacaatgc gccgtctcgt acttcttctc tcgctgcac tacctctaca atcgaactcc 420
 cggttacgtg ttaccagctt atcggagttt ctgagcaagc tgagaaagac gaggtcgtta 480
 agtcggttat aaatttgaaa aaaactgatg ctgaagaggg ttatacaatg gaagctgctg 540
 cagctcgcca ggatcttctc atggatgtta gggataaact tctttttgaa tcagaatatg 600

| | | | | | | |
|------------|------------|------------|-------------|-------------|-------------|------|
| ctggtaacct | aaaagaaaag | attgctccta | aatctcctct | cagaattccg | tgggcatggt | 660 |
| tgcttggtgc | tctatgcctt | cttcaagagg | ttggacaaga | aaaacttggtg | ctggatattg | 720 |
| gccgggctgc | tctcaggaac | cttgattcaa | agccatata | tcatgatata | ttcttatcta | 780 |
| tggcacttgc | tgagtgtgca | attgccaaag | ctgctttcga | ggttaacaag | gtctctcaag | 840 |
| gatttgaagc | tcttgctcgt | gctcaaagtt | ttctgaagag | taaagttact | cttgggaaac | 900 |
| ttgcattggt | aactcagatt | gaggagtcac | tagaggggct | tgcaccacct | tgcacattgg | 960 |
| atctactggg | cctgccacgc | acgccagaaa | atgcagagag | gaggcgaggt | gcaattgccg | 1020 |
| cgctacgcga | actgctcaga | cagggcctta | gtgttgaagc | ttcatgtcaa | attcaagact | 1080 |
| ggccatgctt | tttgagccag | gcaattagca | ggttattggc | cacagagatt | gtcgatcttc | 1140 |
| ttccatggga | tgatttagcc | attacacgga | aaaataaaaa | atcactggaa | tcccacaatc | 1200 |
| aaagagttgt | tattgatttt | aattgtttct | acatgggtgtt | acttgggtcac | atcgctgttg | 1260 |
| gattttcagg | caagcaaaat | gaaacgatta | ataaagcaaa | aacgatatgc | gaatgtctca | 1320 |
| tagcatcaga | aggtgttgat | ctgaaatttg | aggaagcttt | ttgctcattt | cttctaaaac | 1380 |
| agggttccga | ggcagaggcc | ctggaaaaac | ttaagcagct | ggaatcaaat | tcagactctg | 1440 |
| ccgttcgtaa | ttcgatcttg | gggaaagagt | cgagaagtac | ttctgctact | ccctcactgg | 1500 |
| aagcgtggct | aatggagtcc | gtgcttgcta | actttccaga | cacaaggggt | tgttctccat | 1560 |
| ctttggccaa | ttttttccgg | gctgaaaaga | aatatccaga | aaacaagaaa | atgggggtcac | 1620 |
| cttcgatcat | gaatcataag | acgaacccaa | gaccactttc | cacaacacag | ttcgtgaact | 1680 |
| cgtcacaaca | tctttataca | gctgtcgagc | agttgacacc | aacagatttg | cagagcccag | 1740 |
| tggtatcagc | caagaataat | gatgaaacca | gtgccagtat | gccatctgtt | caactgaaga | 1800 |
| ggaaccttgg | tgtacacaaa | aataaaatat | gggatgagtg | gctctctcaa | agcagtttga | 1860 |
| tcggaagggg | atctgttggt | gctttactgg | gttgccaccgt | gttcttctct | ctgaagctat | 1920 |
| caggcattag | gtctggtaga | ctacagagta | tgcctatata | ggtttctgct | aggccgcatt | 1980 |
| cagaatcaga | ttcttttctg | tggaaaacag | agtctgggaa | tttcagaaaa | aaccttgatt | 2040 |
| ctgtgaatag | aaatggtatc | gtgggaaaca | tcaaagtgtc | cattgacatg | ttaaagatgc | 2100 |
| attgtggcga | acatccggat | gccctgtatc | tgaaaagctc | tggtcaatca | gctacatcat | 2160 |
| tgtctcattc | tgcgtcagaa | ctgcataaga | gaccaatgga | tacagaagaa | gcggaagagc | 2220 |
| ttgtgagaca | gtgggaaaat | gttaaggctg | aagctcttgg | accaacacat | caagtttata | 2280 |
| gcctttccga | agtccttgat | gaatccatgc | ttgtccagtg | gcaaacattg | gcacaaacag | 2340 |

cagaggcgaa atcctgttat tggaggttcg ttctgcttca tcttgagggtt ttgcaagcac 2400
 atatattcga agatgggtatt gctgggtgagg ctgcagaaat cgaagctctt ctggaggaag 2460
 cagcagaatt agttgatgaa tctcagccca aaaacgcaaa atattatagc acttacaaga 2520
 tccgatatat tctgaagaag caagaagatg gattgtggaa attctgccaa agcgatattc 2580
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 atcaacagta gaacatggga tcatttagct aacggttggt cttgtttacc taacggtgta 2700
 ggaaagtctc aggtttgttt ctttattcct tagtaacca caggatttgt cttttagat 2760
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 ttgtaaagcg ttactgatca caaaaaaaaa aaaaaaa 2857

<210> 173
 <211> 819
 <212> PRT
 <213> Arabidopsis thaliana

<400> 173

Met Pro Val Ala Tyr Thr Phe Pro Val Leu Pro Ser Ser Cys Leu Leu
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Cys Gly Ile Ser Asn Arg Ser Thr Ser Phe Val Val Asp Arg Pro Glu
 20 25 30

Leu Gln Ile Ser Gly Leu Leu Val Val Arg Ser Glu Ser Gly Glu Phe
 35 40 45

Phe Gly Ser Gly Leu Ser Leu Arg Arg Phe Gln Arg Glu Gly Arg Arg
 50 55 60

Arg Leu Asn Ala Ala Gly Gly Gly Ile His Val Val Asp Asn Ala Pro
 65 70 75 80

Ser Arg Thr Ser Ser Leu Ala Ala Ser Thr Ser Thr Ile Glu Leu Pro
 85 90 95

Val Thr Cys Tyr Gln Leu Ile Gly Val Ser Glu Gln Ala Glu Lys Asp
 100 105 110

Glu Val Val Lys Ser Val Ile Asn Leu Lys Lys Thr Asp Ala Glu Glu
 115 120 125

Gly Tyr Thr Met Glu Ala Ala Ala Arg Gln Asp Leu Leu Met Asp
 130 135 140

Val Arg Asp Lys Leu Leu Phe Glu Ser Glu Tyr Ala Gly Asn Leu Lys
 145 150 155 160

Glu Lys Ile Ala Pro Lys Ser Pro Leu Arg Ile Pro Trp Ala Trp Leu
 165 170 175

Pro Gly Ala Leu Cys Leu Leu Gln Glu Val Gly Gln Glu Lys Leu Val
 180 185 190

Leu Asp Ile Gly Arg Ala Ala Leu Arg Asn Leu Asp Ser Lys Pro Tyr
 195 200 205

Ile His Asp Ile Phe Leu Ser Met Ala Leu Ala Glu Cys Ala Ile Ala
 210 215 220

Lys Ala Ala Phe Glu Val Asn Lys Val Ser Gln Gly Phe Glu Ala Leu
 225 230 235 240

Ala Arg Ala Gln Ser Phe Leu Lys Ser Lys Val Thr Leu Gly Lys Leu
 245 250 255

Ala Leu Leu Thr Gln Ile Glu Glu Ser Leu Glu Gly Leu Ala Pro Pro
 260 265 270

Cys Thr Leu Asp Leu Leu Gly Leu Pro Arg Thr Pro Glu Asn Ala Glu
 275 280 285

Arg Arg Arg Gly Ala Ile Ala Ala Leu Arg Glu Leu Leu Arg Gln Gly
 290 295 300

Leu Ser Val Glu Ala Ser Cys Gln Ile Gln Asp Trp Pro Cys Phe Leu
 305 310 315 320

Ser Gln Ala Ile Ser Arg Leu Leu Ala Thr Glu Ile Val Asp Leu Leu
 325 330 335

Pro Trp Asp Asp Leu Ala Ile Thr Arg Lys Asn Lys Lys Ser Leu Glu
 340 345 350

Ser His Asn Gln Arg Val Val Ile Asp Phe Asn Cys Phe Tyr Met Val
 355 360 365

Leu Leu Gly His Ile Ala Val Gly Phe Ser Gly Lys Gln Asn Glu Thr
 370 375 380

Ile Asn Lys Ala Lys Thr Ile Cys Glu Cys Leu Ile Ala Ser Glu Gly
 385 390 395 400

Val Asp Leu Lys Phe Glu Glu Ala Phe Cys Ser Phe Leu Leu Lys Gln
 405 410 415

Gly Ser Glu Ala Glu Ala Leu Glu Lys Leu Lys Gln Leu Glu Ser Asn
 420 425 430

Ser Asp Ser Ala Val Arg Asn Ser Ile Leu Gly Lys Glu Ser Arg Ser
 435 440 445

Thr Ser Ala Thr Pro Ser Leu Glu Ala Trp Leu Met Glu Ser Val Leu
 450 455 460

Ala Asn Phe Pro Asp Thr Arg Gly Cys Ser Pro Ser Leu Ala Asn Phe
 465 470 475 480

Phe Arg Ala Glu Lys Lys Tyr Pro Glu Asn Lys Lys Met Gly Ser Pro
 485 490 495

Ser Ile Met Asn His Lys Thr Asn Gln Arg Pro Leu Ser Thr Thr Gln
 500 505 510

Phe Val Asn Ser Ser Gln His Leu Tyr Thr Ala Val Glu Gln Leu Thr
 515 520 525

Pro Thr Asp Leu Gln Ser Pro Val Val Ser Ala Lys Asn Asn Asp Glu
 530 535 540

Thr Ser Ala Ser Met Pro Ser Val Gln Leu Lys Arg Asn Leu Gly Val
 545 550 555 560

His Lys Asn Lys Ile Trp Asp Glu Trp Leu Ser Gln Ser Ser Leu Ile
 565 570 575

Gly Arg Val Ser Val Val Ala Leu Leu Gly Cys Thr Val Phe Phe Ser
 580 585 590

Leu Lys Leu Ser Gly Ile Arg Ser Gly Arg Leu Gln Ser Met Pro Ile
595 600 605

Ser Val Ser Ala Arg Pro His Ser Glu Ser Asp Ser Phe Leu Trp Lys
610 615 620

Thr Glu Ser Gly Asn Phe Arg Lys Asn Leu Asp Ser Val Asn Arg Asn
625 630 635 640

Gly Ile Val Gly Asn Ile Lys Val Leu Ile Asp Met Leu Lys Met His
645 650 655

Cys Gly Glu His Pro Asp Ala Leu Tyr Leu Lys Ser Ser Gly Gln Ser
660 665 670

Ala Thr Ser Leu Ser His Ser Ala Ser Glu Leu His Lys Arg Pro Met
675 680 685

Asp Thr Glu Glu Ala Glu Glu Leu Val Arg Gln Trp Glu Asn Val Lys
690 695 700

Ala Glu Ala Leu Gly Pro Thr His Gln Val Tyr Ser Leu Ser Glu Val
705 710 715 720

Leu Asp Glu Ser Met Leu Val Gln Trp Gln Thr Leu Ala Gln Thr Ala
725 730 735

Glu Ala Lys Ser Cys Tyr Trp Arg Phe Val Leu Leu His Leu Glu Val
740 745 750

Leu Gln Ala His Ile Phe Glu Asp Gly Ile Ala Gly Glu Ala Ala Glu
755 760 765

Ile Glu Ala Leu Leu Glu Glu Ala Ala Glu Leu Val Asp Glu Ser Gln
770 775 780

Pro Lys Asn Ala Lys Tyr Tyr Ser Thr Tyr Lys Ile Arg Tyr Ile Leu
785 790 795 800

Lys Lys Gln Glu Asp Gly Leu Trp Lys Phe Cys Gln Ser Asp Ile Gln
805 810 815

Ile Gln Lys

<210> 174
 <211> 491
 <212> DNA
 <213> Triticum aestivum

<220>
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 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (451)..(451)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (471)..(471)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (483)..(484)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (487)..(487)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (489)..(490)
 <223> n is a, c, g, or t

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 gagtatgacc gcgcgctctc tgaggaccgt gacgcggcgc tcacactgga tgttgcttgg 120
 gacaaggttc cgggtgtgct atgtgccctt caggaggctg gggaggcaca ggcagtgtctt 180
 gcaattggag agcacttact ggaggaccgc ccgccaagc ggttcaagca ggatgtggtg 240
 ctggcaatgg cgctcgctta tgtggacata tcaagggatg caatggcggc tagccctcca 300
 gatgtaatcc gctgctgtga ggtgcttgaa agggctctca agctcttgca ggaggatggg 360
 gcaatcaacc ttgcacctgg tctgctttca caaattgatg aaactctgga ggagatcaca 420
 cctcgttgtg ttttggagct tcttgccctt nctcttgatg aaaaacatca nattgaacgc 480
 cannaangnn t 491

<210> 175
 <211> 545
 <212> DNA
 <213> *Gossypium arboreum*

<220>
 <221> misc_feature
 <222> (528)..(528)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (536)..(536)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (540)..(540)
 <223> n is a, c, g, or t

<400> 175
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 tcaccgcctt gataaattgc cagaggttct ggatgggtcaa atgttgaaga catggacaga 120
 tcgtgcagcc gaaatcgctc agcttggttg ggtatatgaa tatagtctac tgaacatggc 180
 cattgacagt gttacccttt cactagatgg ccagcgagct gtagtcgaag ctactctgga 240
 agaatccacc tgcttgactg atgttcatca tccggagaac aatgcctcta atgtaaactc 300
 ctacaccacg agatatgaga tgtcttggtc caactcaggc tggaaaatca ctgaaggatc 360
 tgtctacaaa tcttaactat gatgtataaa gcataaaaag cctgaaagct ccaatgtggt 420
 taccagcttt gcctttttac gtagctatat ttgttatatt gtttgagaaa acaagagtta 480
 gcgttttcca gtcattgcaag cagttcaaat taaaagaggc aatgcttntc atgganaacn 540
 aaatg 545

<210> 176
 <211> 420
 <212> DNA
 <213> *Hordeum vulgare*

<400> 176
 gatgagccca tacagattcc taaaatggat gcgaagctgg cagaagatat tgttcgcaag 60
 tggcagagca tcaaattccaa ggccttggga tcagatcatt ctgttgcatc attgcaagag 120
 gttcttgatg gcaacatgct gaaggatatg acagaccgag cagcagagat tgagcgcaaa 180
 ggctgggttct gggactacac gctgttcaac gtggcgatcg acagcatcac cgtctccctg 240
 gacggacggc gggcgaccgt ggaggcgaca attgaggagg cgggtcagct caccgacgca 300

| | |
|--|-----|
| accgaccccca ggaacgatga tttgtacgac actaagtaca ccacccggta cgagatggcc | 360 |
| ttcaccggac caggaggggtg gaagataacc gaaggcgcag tcctcaagtc gtcatagggc | 420 |

<210> 177
 <211> 606
 <212> DNA
 <213> Triticum aestivum

| | |
|--|-----|
| <400> 177 | |
| ctgcaaactct agcactatgt ttctctttat ctccaggatc tagcctagca ccaacaatcc | 60 |
| aaatacaaca caagaaaaat aaagctcttc gtcgatcaca tcagactaac gcaactatcg | 120 |
| gtcttccaaa ctaaaaagggt cctagactgc ctgcttattt acacaccccc aaaagaaaac | 180 |
| tggaaggaat taacaaactt aatgagggtta ccgcacacca actaccctaa gacgacttga | 240 |
| ggaccgcgcc ttccattatc ttccaccctc ctagtccggg gaaggatcgc tcataccggg | 300 |
| tggtgtactt cgtgtcgtac gagtcgttgt tcttgggggc ggttgcgtcg atgagctggc | 360 |
| ctgcctcctc gatcgttgcc tccacggtcg cccgccgtcc gtccagggag accgtgatgc | 420 |
| tgtcgatcgc cacgtcagac agtgtgtagt cccagaacca gcctttgcgc ccgatctccg | 480 |
| ctgctcgggc cgtccatacc ttcagcatgt tgccatcaag aacctcttgc aatgattcca | 540 |
| cagaatgatc tgatcccaag gccttggttt tgatactctg ccacttgcca acaatatctt | 600 |
| ctgccca | 606 |

<210> 178
 <211> 563
 <212> DNA
 <213> Gossypium arboreum

| | |
|--|-----|
| <400> 178 | |
| tttttttttt tttttttttt tttttttttt ttttttttaa cttgcctctt ttaatttgaa | 60 |
| ctgcttgcct gactggaaaa ccctaactct tgtttttctca aacaatttaa caaatatagc | 120 |
| tccttaaaaa ggcaaagctg gtaaccacat tggagctttc aggccttttta tgctttatac | 180 |
| atcatagtta aaatttgtag acagatcctt cagtgatctt ccaacctgag ttggaacaaa | 240 |
| acatctcata tttcgtgggg taggagttta cattacaggc attgttctcc ggatgatgaa | 300 |
| cattactcaa gccgggggggt tcttccaaaa taacttcgac tacagctcgc tggccattta | 360 |
| atgaaagggt aacactgtca atggccctgt tcagtcaact ttattcatat acccaaccca | 420 |

| | |
|---|-----|
| gctgaccgat ttcggctgca ccaactgtcc atgttttcaa catttgacca tccaaaacct | 480 |
| ttggcaattt atcaaggggg ggatcaagtc caaacgcctc agatttaatg ttctgccact | 540 |
| tgcgacaat gccttttgca att | 563 |

<210> 179
 <211> 360
 <212> DNA
 <213> *Hordeum vulgare*

| | |
|--|-----|
| <400> 179 | |
| gatgagccca tacagattcc taaaatggat gcgaagctgg cagaagatat tgttcgcaag | 60 |
| tggcagagca tcaaattcaa ggccttggga tcagatcatt ctgttgcatc attgcaagag | 120 |
| gttcttgatg gcaacatgct gaaggatgg acagaccgag cagcagagat tgagcgcaaa | 180 |
| ggctgggttct gggactacac gctgttcaac gtggcgatcg acagcatcac cgtctccctg | 240 |
| gacggacggc gggcgaccgt ggaggcgaca attgaggagg cgggtcagct caccgacgca | 300 |
| accgaccca ggaacgatga tttgtacgac actaagtaca ccaccggta cgagatggcc | 360 |

<210> 180
 <211> 300
 <212> DNA
 <213> *Hordeum vulgare*

| | |
|---|-----|
| <400> 180 | |
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| gttctgggac tacacgctgt tcaacgtggc gatcgacagc atcaccgtct ccctggacgg | 120 |
| acggcgggcg accgtggagg cgacaattga ggaggcgggt cagctcaccg acgcaaccga | 180 |
| ccccaggaac gatgatttgt acgacactaa gtacaccacc cggtagcaga tggccttcac | 240 |
| cggaccagga ggggtgaaga taaccgaagg cgcagtcctc aagtcgtcat agggcggtca | 300 |

<210> 181
 <211> 549
 <212> DNA
 <213> *Triticum monococcum*

| | |
|--|-----|
| <400> 181 | |
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| ccccaaactca aagatcttct aagctagcaa taatccgaaa acgacacagg gaaaaacaaa | 120 |
| gctcatcgct gattgcacat cagactaacc aaactatctc caacttcaa actgagaagg | 180 |
| gcctagactg cttatttaca caccaaaaag aacacgggag gaatcaatca acaaaggctc | 240 |

| | |
|---|-----|
| actgcacacc gaacgcccta tgacgacttg aggaccgcac cttctgttat cttccaccct | 300 |
| cctgggtccag tgaagggtcat ctcgtaccgg gtgggtgtact tagtggtcgta caaatcggtg | 360 |
| ttcctgggggt cggttgcata ggtaagctgg cctgcctcct caattgtcgc ctccacagtc | 420 |
| gcccgtcgtc cgtccaggga gacggtgatg ctgtcaatcg ccacgtcgga cagcgtgtag | 480 |
| tcccagaacc agcctttgcg ctcgatctct gctgctcggt ccctccatac cttcagcatg | 540 |
| ttgccatca | 549 |

<210> 182
 <211> 573
 <212> DNA
 <213> Hordeum vulgare

<220>
 <221> misc_feature
 <222> (6)..(6)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (16)..(16)
 <223> n is a, c, g, or t

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|---|-----|
| <400> 182 | |
| gcgagnaagg acgagnatcg tcaagtcggc catcgagctg aggaaatcgg agatcgaaga | 60 |
| tggttacacg gaggaggtgt ccacctgcag acaggctctg ctgctggacg tgagagacaa | 120 |
| gcttctcttt gaacaggagt acgcaggaag caccagggcc aagggtccgc ccagatcctc | 180 |
| tcttcatata ccctggagct gggtgcctgc tgcttgtgt gtcttgcagg aggttgggga | 240 |
| agagaagctg gtcttggaca ttggtcaggc agctctacga cgccctgatt ctaagccata | 300 |
| tgtcacgat gtacttcttg caatggcact agctgaatgc tccattgcaa aagctagctt | 360 |
| tgaaaaaagt aaagtatctc ttggctttga ggctctagca cgtgctcaat atcttttgag | 420 |
| gaaaaaacca tctttagaga agatgcctct tcttgagcag atcgaagaat cacttgaaga | 480 |
| gcttgacca gcttgactc tagaggtttt aagcctgccc cgtacacctg aaaattctga | 540 |
| acgcaggcgt ggtgctattg cagctctctg tga | 573 |

<210> 183
 <211> 400
 <212> DNA
 <213> Beta vulgaris

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<400> 183
gcataacacg gcaagaagat gttgcagtta atggcttttg aaatgaggat gttacaatgg      60
agcttggccg tgataacact ttagattatg tgaatttagc cagttcaa at tttactgaag      120
ataatatcga gcaagaatcg gttactgaga agataaaaga tttagggtgtg aagggttatgt      180
gtgccggtgt ggtgattgga ctgacaactt tggctggcat gaaacttttg cctggcagaa      240
gtgggtctgc cattccacac aggcattctg gttctgctgt ggcttctgat gtctccagtgt      300
tggggctctc agtaaatgaa actactgagg agaaagtacc aaaaatggat gcaagacttg      360
cagaagttct agttagaaga tggcagaacg ttaaatacaca                               400

```

```

<210> 184
<211> 631
<212> DNA
<213> Prunus persica

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```

<220>
<221> misc_feature
<222> (21)..(21)
<223> n is a, c, g, or t

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```

<400> 184
gcagttgcaa ttgctggggg ngattcacta cgtgaaaatt tcatgaacga ggccttcttg      60
catatgactg cagctgagca ggttgattta tttgtagcta cccccagtaa tatccccggca      120
gaaagctttg aagtttatgg ggtggctctt gcgcttggtg ctcaagcctt tgttggtaaa      180
aaacctcatc acattcaaga tgctgaaaac ctattccaga aacttcagca gtctaaggta      240
acagctgtag gacattctct tgacaactat ataaccaaag aaagcagtga gatagacttt      300
gctttggaga ggggactctg ttcacttctt ctaggggacc ttgatgacag tcgttcgtgg      360
ttgggcctag acagtaatga ttcaccatat agaaatccat ctgttgtaga ctttgtcttg      420
gagaactcaa aggatgacga tgacaatgac aatgacaatg atcttccttg actttgcaag      480
ctattggaga cgtgggtgat ggaggtggta ttccccagg ttagagacac caaagacata      540
gagttcagac tgggagacta ctatgatgat cctacagtct tgagatactt agaaaggctg      600
gatggcacta atggttcacc cttagctgct g                               631

```

```

<210> 185
<211> 647
<212> DNA
<213> Helianthus annuus

```

<400> 185
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aatgtggagg attctagggt tgaggatgct gaagacattc ctaaaatgga tgcaagatta 180
gccgaagggtc tagttcgtaa gtggcagagc ataaaatccc aagcccttgg acctgagcat 240
tgccactcaa aattatcata ggtattagat ggtgaaatgc acaagatctg gcttcaacgg 300
gcaaccgaaa ttgctcaacg tggttggttt tgggactaca cgcttttaaa cattaccatt 360
gacagtgtta ccgtttcact cgatgggagc ttagctgttg tggaagcaac ccttgaagag 420
tctgccaagt tgattgattt gacccacccg gaaaacaatg actcctataa tttaacttac 480
accacacggt atgagatgtc gtgtgccaag tcatcatgga aaatcacaaa gggggctgtc 540
ctcaaatcat aacagatgta attctttctc accttttctg tatttatctg ttattagatt 600
actcagcagt tgaatgatat gtttctccac catttcgatc atgagcg 647

<210> 186
<211> 652
<212> DNA
<213> Helianthus annuus

<400> 186
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tactagtact actgctcgta aagaagtga ttcggctctg gcttcagacg tcaccaatag 120
gattctaggg ttgaggatgc tgaagacatt cctaaaatgg atgcaagatt agccgagggt 180
ctagttcgta agtggcagag cataaaatcc caagcccttg gacctgagca ttgccactca 240
aaattatcag aggtattaga tggtgaaatg cacaagatct ggcttcaacg ggcaaccgaa 300
attgctcaac gtggttggtt ttgggactac acgcttttaa acattaccat tgacagtgtt 360
accgtctcac tcgatgggag cttagctgtt gtggaagcaa cccttgaaga gtctgccaag 420
ttgattgatt tgaccacccc ggaaaacaat gactcctata atttaactta caccacacgt 480
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taacagatgt aattctttct cacttttct gtatttaact gttattagat tactcagcag 600
ttgaatgata tgtttctcca ccatatcgat catgagtgtg tttggtgctg cc 652

<210> 187
<211> 460
<212> DNA
<213> Populus tremula

<400> 187
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gaaattgggtt cggcaatggc atctgacacc atcaatttga attcagcagt agatgaacaa 180
atttccgagg acttaccag aatggatgca aggggtgcag aggatatagt tcgcaagtgg 240
caaaacatta aatctcaggc ttttggaact gatcactgcc tggcaaaatt gccagagggt 300
ttggatagtc agatgttgaa aatatggaca gatcgtgcgg ccgaaattgc acatcttggg 360
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<210> 188
<211> 3933
<212> DNA
<213> Chlamydomonas reinhardtii

<400> 188
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gctgccgct actctgcgga caccctcttc gcacgcgcgg tgctactcaa ggcagccgcg 180
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acagccctgc gcgtcagcca gcaggacct cccggagccc ttgtcgtgct gcaggagggt 300
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attcttcacg catgagcgca gacttttacc ctatcaagtc ccgccctcgc ccgccttctc 480
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cgcgctgggt agcgctcac ctcccagctg cagccgcgc cggcctcagc gctgccaggc 660
cccgatggcg cggcggtgcc gcacgcgcac gtgggcgcgg tgctgcccgc atgcgacgac 720
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ttggctgatg catcgtcac ccccgccctc caaccgaat gccctcagga cctggcgcca 1020

| | | | | | | |
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| gagtacgcgt | gcgagctggc | cgccctgccg | ctgggcgccg | agaccgccgc | ccggcgccgc | 1080 |
| aagggcgtgg | cgctcatgcg | cggtgtgctg | cgcgcgcccg | ccaccgtggc | cgccgccaca | 1140 |
| gccaagtagg | tgacaagcac | gcaggaaatc | gtgtgctata | ttgcattgcg | gtaccttgcc | 1200 |
| ttgcatcgcg | gaggcagtgc | tcgagaatgc | gtttcgtgcg | cgtgatccgt | ttgctcgtcg | 1260 |
| tgccttatcc | gccaccccag | gcccgaaggct | gctgctgacg | acagcgacga | cgacgaggtg | 1320 |
| gaccgcgcga | gtgtgctggc | ggccgccccg | cgcattgctga | cccgcagccg | cgacgtgctc | 1380 |
| acctgcagcg | agcaggtaca | gcgctgcaac | cgggcagtta | tagatggatg | caagtgcgtg | 1440 |
| gacgccgaac | gtacagtttt | tgctgtgttc | cccgcgtgca | ccttagccgc | tcctcctgca | 1500 |
| accctcactt | gcgacctcaa | tgcgtgcacc | ttagccgctc | ctcctgcaac | cctcagttgc | 1560 |
| gacctcacga | cacaccgtct | ggcttaccct | tgtcccccacc | ccaggtggcc | ctgctgccgg | 1620 |
| acgcgctgcg | cggcagcggt | gtgtcgccca | ccccggacgc | gctgtacgac | ggcgccctgg | 1680 |
| cgcacctggg | ggacggcttc | cgaacaggct | ggccgcactc | cgtgcaccag | gtgggggagc | 1740 |
| gcggtgcctg | gatgtctgga | tggtcactgg | ccgcaaggct | gtgcgcacca | tcgggtagag | 1800 |
| tgtaaccaaa | tgatgtgcgc | gcaatgaagg | gtgagcagat | tccagcctcc | ctctgtcggc | 1860 |
| tggcgtccaa | ctgtgccaac | tgcgcacaca | cctgcgcacg | ccccaggccg | accagctgct | 1920 |
| ggccaagctg | gaggcgcagc | aggcccgcgc | agccgccatg | cgcgcgcagc | agtccgagct | 1980 |
| ggcgcgcgcc | gcccgcagccc | gccgtgccat | gtacagcggt | cccgcgcgcc | cccacggctc | 2040 |
| caccctgtac | accaactaca | acaaccctgc | cggcagcggc | aatggcgcgc | cgccgccgcc | 2100 |
| gccccgcccc | atgcccatgg | tgccagggg | cgacggccag | cacgccatgg | cggcgtctgt | 2160 |
| ggcggcgcac | gtgcactcca | cggcgatggc | ggagcacgcg | gcgcgcagcg | cggctggcgg | 2220 |
| cgcgcgcggc | gcctccgatg | gcggcgcgca | cgccaacggc | gtggctctag | agcgggcccgt | 2280 |
| gtgcgccgtc | ctgctgggtg | actacaccgc | ggcgggtggag | cggctggggc | tagacacgaa | 2340 |
| cgcggcgggt | gagcaggagc | agctgcgcga | gttcgtcctg | gtgcgccggg | gagggcctac | 2400 |
| tgcaaaacgt | gttgctcagg | gtcttgagat | accgaacaca | atgttttcgt | atacatctcc | 2460 |
| cgctcagaga | gctatgcctc | caccgtcggc | ccggctccac | tgcacccgat | gcggttgcat | 2520 |
| gcccactcgc | ccaacggccg | cggcgacctg | cgcgcggggc | tgagggcgct | ggccaccgcg | 2580 |
| tggctggagg | gcgtggcgct | ggcgtccttc | cgcgacactg | ccggcagccc | cgtgccgccg | 2640 |
| ctggaggcca | gctggttcgc | ggacctgcgt | gtcgccttct | atctgcaggt | gaggggcggc | 2700 |
| agaagagagg | ggggaaaggg | aggcgagaag | gcgcttccgc | cgttggcgca | acgggccatc | 2760 |

| | | | | | | |
|------------|-------------|-------------|------------|------------|-------------|------|
| ctggtggagc | acggcgctac | atcgcatctg | gtccaccgtc | tctggatgta | taattcgtgc | 2820 |
| actcttaacc | ggccgcgcag | gtatggcggc | tgtgccgcgt | ggagcaggtg | ctggccgccg | 2880 |
| cccacttcct | ggccaacctg | ctgccaaca | tgctcaaggc | catcgccggc | actgccgtca | 2940 |
| aggtcgcagc | caacaccgcc | gtggcagcct | cccgcgcgca | gcgcctcagc | gccaccgtcg | 3000 |
| cggccagcac | cgccaccgcc | tcgtcatctt | cctctgccgc | ccgcggcgct | cgtgccgggtg | 3060 |
| ccctgagcgc | tgccaccgcc | gccgcacacg | ccgcgcgccg | ccagcaggcg | aacgcggtcg | 3120 |
| gtgccagcat | cgtcgggtgct | gacgtgctgc | ccccacagc | agtggccgcg | gctgccgcgg | 3180 |
| ctggcacagc | ggccgcgccg | gcagtcaccg | gccccgccct | cggccgtggc | gctgcagctt | 3240 |
| ccgcctcttc | ctttgaggag | ggcgcgcgtg | aggccgctga | cctgcgtcgt | cgctttgtcg | 3300 |
| ccaccagccg | cggcgccagc | gcggccgtcg | gtgcgcccac | agcaccagcc | gctatgactg | 3360 |
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| tggcgggcct | ggagaaggcc | atgtgggact | cggagctgcc | gccgccgccg | ccatcccgcg | 3540 |
| cgcagaaggc | gctcacctac | gccgcaggac | tggtgagttg | ctgcgcagcc | tgacggccat | 3600 |
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| ccaacaaggc | tgttgaccaa | gctgctgctg | cccttgcact | ctttcaacgc | ccgtctgcag | 3780 |
| ctggccgtgg | tggtggcctt | cctgggtgtcc | agcttcttcc | gccgcaacga | cggcgccgcc | 3840 |
| tccgccctgg | caccgcgccg | cgtcaccacc | gcctccgtgg | ccgttagcgc | gcagcccgcc | 3900 |
| aagccgggca | aggccacccg | ctccgcgcac | tga | | | 3933 |

<210> 189

<211> 2511

<212> DNA

<213> Chlamydomonas reinhardtii

<400> 189

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| cgcgtaagcc | gccctgacgc | cattcgcaag | gcgtatgaga | acctggtgaa | gcaaccccc | 120 |
| gctgccgcgt | actctgcgga | caccctcttc | gcacgcgcgg | tgctactcaa | ggcagccgcg | 180 |
| gagtcgctga | ccgacccgga | cctgcgccgc | tcatatgacg | ccaagctggc | cgctggtcac | 240 |
| acagccctgc | gcgtcagcca | gcaggacctc | cccggagccc | ttgtcgtgct | gcaggagatc | 300 |
| ggcgagcacc | agttggttct | ggatctgggt | ctgcgctggc | tagaggtaaa | cggcggccag | 360 |

| | |
|--|------|
| cccgacgccg gcgacgtggc cgctgccgtg gccctggcct actgtgaccg cgctggtgag | 420 |
| cgctcacct cccagctgca gccgccgccg gcctcagcgc tgccaggccc cgatggcgcg | 480 |
| gcggtgccgc acgcgcacgt gggcgcggtg ctgcccgcac gcgacgacct ggacgcagcg | 540 |
| ctgagcaagc tccggcggtg cgccatggcg cagcagctgc agcagcagat cgtgggcgcg | 600 |
| ctgcgggacc tggcgccaga gtacgcgtgc gagctggccg ccctgccgct gggcgccgag | 660 |
| accgccgccg ggcgcgcaa gggcgtggcg ctcatgcgcg gtgtgctgcg cgccgccgcc | 720 |
| accgtggccg ccgccacagc caagcccag gctgctgctg acgacagcga cgacgacgag | 780 |
| gtggacccgc gcagtgtgct ggcggccgcc cgccgcacgc tgacccgcag ccgcgacgtg | 840 |
| ctcacctgca gcgagcaggt ggcctgctg ccggacgcgc tgcgcggcag cgggtgtgctg | 900 |
| cccaccccg acgcgtgta cgacggcgcc ctggcgccacc tggaggacgg cttccgcaac | 960 |
| ggctggccgc actccgtgca ccaggccgac cagctgctgg ccaagctgga ggcgcagcag | 1020 |
| gcccgcgagc ccgccatgcg ccgcgagcag tccgagctgg ccgccgccgc cgcagcccg | 1080 |
| cgtgccatgt acagcggtcc cgccgccgcc cacgggtccca ccctgtacac caactacaac | 1140 |
| aaccctgccg gcagcggcaa tggcgcgccg ccgccgccgc cccgccccat gcccatggtg | 1200 |
| cccaggggag acggccagca cgccatggcg gcgtctgtgg cggcgcatgt gcaactccacg | 1260 |
| gcgatggcgg agcacgcggc gcgcagcgcg gctggcgggc ccgccggcgc ctccgatggc | 1320 |
| ggcgcgacg ccaacggcgt ggctctagag cgggcccgtg gcgccgtcct gctgggtgac | 1380 |
| tacaccgcgg cggaggagcg gctggggcta gacacgaacg cggcggtgga gcaggagcag | 1440 |
| ctgcgcgagt tcgtcctggc ccaactgccc aacggccgcg gcgacctgcg cccgggcctg | 1500 |
| agggcgctgg ccacccgctg gctggagggc gtggcgctgg cgtccttccg cgacactgcc | 1560 |
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| aacctgctgc ccaacatgct caaggccatc gccggcactg ccgtcaaggc cgcagccaac | 1740 |
| accgccgtgg cagcctcccc cgcgacgcgc ctacgcgcca ccgtcgcggc cagcaccgcc | 1800 |
| accgcctcgt catcttcctc tgccgccgcg ggcgctcgtg ccggtgccct gagcgtgcc | 1860 |
| accgccgccg cacacgccgc gcgccgccag caggcgaacg cggtcggtgc cagcatcgtc | 1920 |
| gggtgctgac tgctgcccc cacagcagtg gccgcggctg ccgcggctgg cacagcggcc | 1980 |
| gccgccgcag tcaccggccc cgccctcggc cgtggcgctg cagcttccgc ctcttccttt | 2040 |
| gaggagggcg ccgctgaggc cgctgacctg cgtcgctcgt ttgtcgccac cagccgcggc | 2100 |

gccagcgcgg cgcgcggtgc gccacagca ccagccgcta tgactgggccc ccagcacggc 2160
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<210> 190
 <211> 836
 <212> PRT
 <213> Chlamydomonas reinhardtii

<400> 190

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Leu His Val Pro Arg Val Ser Arg Pro Asp Ala Ile Arg Lys Ala Tyr
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Glu Asn Leu Val Lys Gln Pro Pro Ala Ala Ala Tyr Ser Ala Asp Thr
 35 40 45

Leu Phe Ala Arg Ala Val Leu Leu Lys Ala Ala Ala Glu Ser Leu Thr
 50 55 60

Asp Pro Asp Leu Arg Arg Ser Tyr Asp Ala Lys Leu Ala Ala Gly His
 65 70 75 80

Thr Ala Leu Arg Val Ser Gln Gln Asp Leu Pro Gly Ala Leu Val Val
 85 90 95

Leu Gln Glu Ile Gly Glu His Gln Leu Val Leu Asp Leu Gly Leu Arg
 100 105 110

Trp Leu Glu Val Asn Gly Gly Gln Pro Asp Ala Gly Asp Val Ala Ala
 115 120 125

Ala Val Ala Leu Ala Tyr Cys Asp Arg Ala Gly Glu Arg Leu Thr Ser
 130 135 140

Gln Leu Gln Pro Pro Pro Ala Ser Ala Leu Pro Gly Pro Asp Gly Ala
 145 150 155 160

Ala Val Pro His Ala His Val Gly Ala Val Leu Pro Ala Cys Asp Asp
 165 170 175

Leu Asp Ala Ala Leu Ser Lys Leu Arg Arg Tyr Gly Met Ala Gln Gln
 180 185 190

Leu Gln Gln Gln Ile Val Gly Ala Leu Arg Asp Leu Ala Pro Glu Tyr
 195 200 205

Ala Cys Glu Leu Ala Ala Leu Pro Leu Gly Ala Glu Thr Ala Ala Arg
 210 215 220

Arg Ala Lys Gly Val Ala Leu Met Arg Gly Val Leu Arg Ala Ala Ala
 225 230 235 240

Thr Val Ala Ala Ala Thr Ala Lys Pro Glu Ala Ala Ala Asp Asp Ser
 245 250 255

Asp Asp Asp Glu Val Asp Pro Arg Ser Val Leu Ala Ala Ala Arg Arg
 260 265 270

Met Leu Thr Arg Ser Arg Asp Val Leu Thr Cys Ser Glu Gln Val Ala
 275 280 285

Leu Leu Pro Asp Ala Leu Arg Gly Ser Gly Val Ser Pro Thr Pro Asp
 290 295 300

Ala Leu Tyr Asp Gly Ala Leu Ala His Leu Val Asp Gly Phe Arg Asn
 305 310 315 320

Gly Trp Pro His Ser Val His Gln Ala Asp Gln Leu Leu Ala Lys Leu
 325 330 335

Glu Ala Gln Gln Ala Arg Ala Ala Ala Met Arg Arg Glu Gln Ser Glu
 340 345 350

Leu Ala Ala Ala Ala Ala Ala Arg Arg Ala Met Tyr Ser Gly Pro Ala
 355 360 365

Ala Ala His Gly Pro Thr Leu Tyr Thr Asn Tyr Asn Asn Pro Ala Gly
 370 375 380

Ser Gly Asn Gly Ala Pro Pro Pro Pro Pro Arg Pro Met Pro Met Val
 385 390 395 400

Pro Arg Gly Asp Gly Gln His Ala Met Ala Ala Ser Val Ala Ala His
 405 410 415

Val His Ser Thr Ala Met Ala Glu His Ala Ala Arg Ser Ala Ala Gly
 420 425 430

Gly Ala Ala Gly Ala Ser Asp Gly Gly Ala His Ala Asn Gly Val Ala
 435 440 445

Leu Glu Arg Ala Val Cys Ala Val Leu Leu Gly Asp Tyr Thr Ala Ala
 450 455 460

Val Glu Arg Leu Gly Leu Asp Thr Asn Ala Ala Val Glu Gln Glu Gln
 465 470 475 480

Leu Arg Glu Phe Val Leu Ala His Ser Pro Asn Gly Arg Gly Asp Leu
 485 490 495

Arg Pro Gly Leu Arg Ala Leu Ala Thr Arg Trp Leu Glu Gly Val Ala
 500 505 510

Leu Ala Ser Phe Arg Asp Thr Ala Gly Ser Pro Val Pro Pro Leu Glu
 515 520 525

Ala Ser Trp Phe Ala Asp Leu Arg Val Ala Phe Tyr Leu Gln Val Trp
 530 535 540

Arg Leu Cys Arg Val Glu Gln Val Leu Ala Ala Ala His Phe Leu Ala
 545 550 555 560

Asn Leu Leu Pro Asn Met Leu Lys Ala Ile Ala Gly Thr Ala Val Lys
 565 570 575

Val Ala Ala Asn Thr Ala Val Ala Ala Ser Arg Ala Gln Arg Leu Ser
 580 585 590

Ala Thr Val Ala Ala Ser Thr Ala Thr Ala Ser Ser Ser Ser Ala
 595 600 605

Ala Arg Gly Ala Arg Ala Gly Ala Leu Ser Ala Ala Thr Ala Ala Ala
 610 615 620

His Ala Ala Arg Arg Gln Gln Ala Asn Ala Val Gly Ala Ser Ile Val
 625 630 635 640

Gly Ala Asp Val Leu Pro Pro Thr Ala Val Ala Ala Ala Ala Ala Ala
 645 650 655

Gly Thr Ala Ala Ala Ala Ala Val Thr Gly Pro Ala Leu Gly Arg Gly
 660 665 670

Ala Ala Ala Ser Ala Ser Ser Phe Glu Glu Gly Ala Ala Glu Ala Ala
 675 680 685

Asp Leu Arg Arg Arg Phe Val Ala Thr Ser Arg Gly Ala Ser Ala Ala
 690 695 700

Val Gly Ala Pro Thr Ala Pro Ala Ala Met Thr Gly Pro Gln His Gly
 705 710 715 720

Ala Ala Ser Ala Ala Gln Ser His Arg Glu Glu Asp Glu Asp Ser His
 725 730 735

Gly Gly Gln Glu Gly Gly Val Pro Arg Arg Met Ser Glu Ala Asp Leu
 740 745 750

Arg Ala His Leu Ala Gly Leu Glu Lys Ala Met Trp Asp Ser Glu Leu
 755 760 765

Pro Pro Pro Pro Pro Ser Arg Ala Gln Lys Ala Leu Thr Tyr Ala Ala
 770 775 780

Gly Leu Leu Ala Val Val Val Ala Phe Leu Val Ser Ser Phe Phe Arg
 785 790 795 800

Arg Asn Asp Gly Ala Ala Ser Ala Leu Ala Pro Ala Ala Val Thr Thr
 805 810 815

Ala Ser Val Ala Val Ser Ala Gln Pro Ala Lys Pro Gly Lys Ala Thr
820 825 830

Arg Ser Ala His
835

<210> 191
<211> 2022
<212> DNA
<213> Thermosynechococcus elongatus

<400> 191
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accacagttg ccacccgtcg cgaactcatt gagcaggcct atgcagtttt gcgagaaccg 180
gagcagcgcg atgcctacga tcgccactgc cgtaccgttg atcccgatga tttgattgcc 240
cagttggatc ccgatgccac cactccccac attgaaatta gtgatgagca attgtcgggg 300
gcactcctac tgctgtatga actaggaaat tatgccaag ttgtcaacct gggagacgcc 360
tttcttaaaa aggatgtttt tgagcgcaat cgccctaca cttccctgc cgccgttgcc 420
gacattaccc tcaactgtggc tttggcctat ctggaattgg gacgggagga atggcagcgg 480
cagtcctatg aatcagccgc ctctcagcta gaagccggtc tccagggtact tcagcgggta 540
aatttgtttc ccgagctcca ggagcagttt cagacggaac tgaatcggct gcgtccctac 600
cgcattctgg aattactggc actgcctttg tccgatagtg cgaatcggca gcgggggtatt 660
ttattgctgc ggcaaagtct gagtgagcgc gggggcattg aggggcgcgg tgacgatcgc 720
tcaggactaa cagttgagga ttttctgaaa tttattttgc aactgcgcag ccatcttacc 780
gtggcagaac aacaggaact ctttgaacgg gaatcgcggc gtccctcagc ggtggccacc 840
taccttgccg tacatgcctt ggtagcacgg ggagtgcatt aactgcagcc gagctatatt 900
tgtcgggcca aggatttatt gcagcagctg ctccccatc aagacgtcta tcttgaactt 960
gccagttgct tgctgctttt gggacagccc accgaggcct tggcagctct tgaccacagc 1020
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ccggggccttt attactacac cacacaatgg ctcacggagg aaatttatcc tgcatttcgg 1140
gacttggggg aaacaccgtt ggccttgagg gcttactttg ctgatgcaa tgtccaaacc 1200
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gaaacgttac cgttgacagga tcagagtcgg ctgggtcagg gcctttcggc atcggctttt 1380
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 gttcttgtgg gtttaggggc gttggcaaaa gtctattggc ccgccaaaac cgctgaagcc 1560
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 ccgacgacct tagccatcac tttaacacca gagatggcgc gcgatcgcct ccacacttgg 1680
 cagcaaatta aagcccaagc ccttgggcga ccatttgagg tggacaaact aacaacgatt 1740
 ttggcgggagc cagaactcag ccgctggcga tcgcgggcac agggcttaaa gtccgagggc 1800
 agctattggg tttataccct aaagaactta gaagtgaagg aagtccgcct ccaaaggagc 1860
 gatcgtgtgg aggtgttggc agaagtcaac gaggatgccc gtttctatga acaggggaacc 1920
 ctgcgcactg atatttccta tagcgatccc taccgggtca tttatacctt tatccgtcgc 1980
 ggcaatcaat ggttgattca aggcattgcag gtgggttagtt aa 2022

<210> 192
 <211> 673
 <212> PRT
 <213> Thermosynechococcus elongatus

<400> 192

Met Arg Ile Pro Leu Asp Tyr Tyr Gln Val Leu Gly Val Pro Ile Gln
 1 5 10 15

Ala Thr Pro Glu Gln Ile Glu Gln Ala Phe Arg Asp Arg Leu Leu Gln
 20 25 30

Leu Pro Thr His Gln His Ser Pro Thr Thr Val Ala Thr Arg Arg Glu
 35 40 45

Leu Ile Glu Gln Ala Tyr Ala Val Leu Arg Glu Pro Glu Gln Arg Asp
 50 55 60

Ala Tyr Asp Arg His Cys Arg Thr Val Asp Pro Asp Asp Leu Ile Ala
 65 70 75 80

Gln Leu Asp Pro Asp Ala Thr Thr Pro His Ile Glu Ile Ser Asp Glu
 85 90 95

Gln Leu Ser Gly Ala Leu Leu Leu Tyr Glu Leu Gly Asn Tyr Ala
 100 105 110

Gln Val Val Asn Leu Gly Asp Ala Phe Leu Lys Lys Asp Val Phe Glu
 115 120 125
 Arg Asn Arg Pro Tyr Thr Ser Pro Ala Ala Val Ala Asp Ile Thr Leu
 130 135 140
 Thr Val Ala Leu Ala Tyr Leu Glu Leu Gly Arg Glu Glu Trp Gln Arg
 145 150 155 160
 Gln Ser Tyr Glu Ser Ala Ala Ser Gln Leu Glu Ala Gly Leu Gln Val
 165 170 175
 Leu Gln Arg Val Asn Leu Phe Pro Glu Leu Gln Glu Gln Phe Gln Thr
 180 185 190
 Glu Leu Asn Arg Leu Arg Pro Tyr Arg Ile Leu Glu Leu Leu Ala Leu
 195 200 205
 Pro Leu Ser Asp Ser Ala Asn Arg Gln Arg Gly Ile Leu Leu Leu Arg
 210 215 220
 Gln Met Leu Ser Glu Arg Gly Gly Ile Glu Gly Arg Gly Asp Asp Arg
 225 230 235 240
 Ser Gly Leu Thr Val Glu Asp Phe Leu Lys Phe Ile Leu Gln Leu Arg
 245 250 255
 Ser His Leu Thr Val Ala Glu Gln Gln Glu Leu Phe Glu Arg Glu Ser
 260 265 270
 Arg Arg Pro Ser Ala Val Ala Thr Tyr Leu Ala Val His Ala Leu Val
 275 280 285
 Ala Arg Gly Val His Glu Leu Gln Pro Ser Tyr Ile Cys Arg Ala Lys
 290 295 300
 Asp Leu Leu Gln Gln Leu Leu Pro His Gln Asp Val Tyr Leu Glu Leu
 305 310 315 320
 Ala Ser Cys Leu Leu Leu Leu Gly Gln Pro Thr Glu Ala Leu Ala Ala
 325 330 335

Leu Asp His Ser Gln Asp Gln Pro Thr Leu Asp Phe Ile Arg Arg His
 340 345 350
 Ala Gly Glu Ala Gly Asp Arg Leu Pro Gly Leu Tyr Tyr Tyr Thr Thr
 355 360 365
 Gln Trp Leu Thr Glu Glu Ile Tyr Pro Ala Phe Arg Asp Leu Gly Glu
 370 375 380
 Thr Pro Val Ala Leu Glu Ala Tyr Phe Ala Asp Ala Asn Val Gln Thr
 385 390 395 400
 Tyr Leu Glu Ala Leu Ser Glu Asp Ser Ile Ala Pro Glu Pro Pro Ala
 405 410 415
 Thr Thr Ala Ser Ala Leu Pro Glu Val Ile Arg Pro Thr Val Ala Val
 420 425 430
 Pro Pro Pro Leu Ser Phe Thr Ala Glu Thr Leu Pro Leu Gln Asp Gln
 435 440 445
 Ser Arg Leu Gly Gln Gly Leu Ser Ala Ser Ala Phe Thr Pro Ser Ala
 450 455 460
 Thr Ala Thr Gly Thr Ser Met Pro Gln Pro Ser Pro Arg Lys Arg Arg
 465 470 475 480
 Ser Pro Arg Asn Arg Cys Ala Gln Lys Arg Gln Thr Trp Phe Trp Met
 485 490 495
 Gly Ala Gly Val Val Leu Val Gly Leu Gly Ala Leu Ala Lys Val Tyr
 500 505 510
 Trp Pro Ala Lys Thr Ala Glu Ala Pro Pro Pro Pro Val Thr Pro Ala
 515 520 525
 Pro Thr Pro Val Ala Thr Pro Thr Pro Thr Pro Gln Pro Thr Thr Leu
 530 535 540
 Ala Ile Thr Leu Thr Pro Glu Met Ala Arg Asp Arg Leu His Thr Trp
 545 550 555 560

Gln Gln Ile Lys Ala Gln Ala Leu Gly Arg Pro Phe Glu Val Asp Lys
565 570 575

Leu Thr Thr Ile Leu Ala Glu Pro Glu Leu Ser Arg Trp Arg Ser Arg
580 585 590

Ala Gln Gly Leu Lys Ser Glu Gly Ser Tyr Trp Val Tyr Thr Leu Lys
595 600 605

Asn Leu Glu Val Lys Glu Val Arg Leu Gln Arg Ser Asp Arg Val Glu
610 615 620

Val Leu Ala Glu Val Asn Glu Asp Ala Arg Phe Tyr Glu Gln Gly Thr
625 630 635 640

Leu Arg Thr Asp Ile Ser Tyr Ser Asp Pro Tyr Arg Val Ile Tyr Thr
645 650 655

Phe Ile Arg Arg Gly Asn Gln Trp Leu Ile Gln Gly Met Gln Val Val
660 665 670

Ser

<210> 193
<211> 2370
<212> DNA
<213> *Trichodesmium erythraeum*

<400> 193
gtgcggattc cattagatta ttatcgaatt ttaggtttac caattcaggc tactgctgaa 60
cagttgcggc aggcacatca agaccgcact cagcagtttc ctagaaggga gtatttctgaa 120
gccacaatag ttgctcgtaa acagcttata gatgaggctt atgctgttct ttgcgatcct 180
gaacaacgtc aaacctatga tggttaacttt ttagctaaaa cctacgagcc aatagtagaa 240
gaactcaatc caagttctca gataaatttt gatcaagcac aagaaaaaga aaccacactt 300
aaggagacta gagaagttct tccggaaata gcttctaaac agttaaaaaa aaggacaagt 360
tatcaaaaca gagagactaa agctgcctct gattttcatt ctaatacccc tagtatagaa 420
atagaatatc cacaatttgt gggagccatc ctaattttac atgagctagg agaatatgag 480
ctagtattaa aaataactca cccttatctt cttacaata gtataactat taaagatgga 540
cgttttggag acccagcatt agttttgcca gatgttgctc ttacagttgc tctagcaaat 600

| | | | | | | |
|------------|-------------|-------------|-------------|--------------|-------------|------|
| ttagaattgg | gcagagagga | atggcaacaa | ggacaatacg | aaagtgcagc | tacagcttta | 660 |
| gaggctggcc | tagggttatt | gctacgagaa | aacctatttg | tccaaatacg | aggagagata | 720 |
| caagctgacc | tttataagct | acgtccttat | agaataatgg | agctaatagc | actaccagag | 780 |
| gaaatagctc | tagaccgtag | ccgtggacta | gaaattcttc | aagatatgct | caatgaacgg | 840 |
| ggaggaattg | atggtcaagg | tgaagatagc | tctggacttg | ggatagaaga | ttttctaaag | 900 |
| tttgttcagc | agctacgtca | atacttaact | acagcagagc | aaaagaagtt | at ttgaggca | 960 |
| gaagcccttc | gcccttccgc | agttggtgca | tatctagcgg | tttatacttt | tttagctcaa | 1020 |
| gggtttgctc | aaaaacaacc | agcctttatt | cgtaaagcta | agttgatggt | aatgcaattg | 1080 |
| ggtcggagtc | aagatgtaaa | tttagagaaa | tctgtctgtg | ctttactttt | agggcaaact | 1140 |
| gaagaagcta | gtcgttcatt | agaacttagc | catgaaaatg | aacctctatc | ctttattaaa | 1200 |
| gaaaattctc | aacaatctcc | agatttattg | ccagggtctat | gtctctatgc | tgaacattgg | 1260 |
| ttgacagagg | agggtttttcc | acatttccgt | gatttgtctg | acaagtcagc | ttctttgaaa | 1320 |
| gattattttg | cagatcaaca | tgttcaagct | tatctagaag | ctttacctac | agaagcagag | 1380 |
| gtagctaatc | aatgggtagt | cgttcagcct | cgtcgtagta | atcacaataa | aaaacaaatg | 1440 |
| ttcgacccca | aggaacttga | gaagttgaat | gtatcagatt | tggaggataa | agatatttct | 1500 |
| cgggtagatg | ctactgctac | tggtattggt | gcttctggaa | gtcaaggaag | ttctaattta | 1560 |
| ctaggggcta | gttctgatgg | gttgcttcaa | gaattagaaa | aatcatcatc | tactagaggt | 1620 |
| gggccaaaac | aagtaactac | taagagttct | agtcactatt | taggaaaaat | tagggaaaag | 1680 |
| agtataagtg | gtttacctga | gtttaatgaa | agtacatcta | ttgagagtgg | ggggttaccc | 1740 |
| caatctatcc | aagagcatag | ttcacgtaga | acttctgcta | gaagagaacc | tgtaagtgtt | 1800 |
| ggtcgtttta | tattaatcgc | aattgtggga | tttttgttaa | taggatttat | tgggttggtta | 1860 |
| acaattaaaa | ctatcggctg | gttagtaaat | gctttaggat | gggaaagaga | aaaactgatg | 1920 |
| atacaattgg | ataggcctcc | tatagaaatc | ccagaacctg | atcgggttaa | cctcgcagca | 1980 |
| tcaggaccga | taacaaaaga | agtagcaagg | cgaacaattc | aaagttgggt | agatatcaag | 2040 |
| gcttctgctc | ttggtcctaa | tcataaaatt | gaacaattac | caaataat ttt | agtagaaccg | 2100 |
| gcactttctc | gttggttacc | tacagcta at | gccctgaagc | aagaaaagtc | ataccgtagg | 2160 |
| tatgagcatg | atttagaaat | aagtaatata | aagatgagta | atacaaat ttc | taatctcgct | 2220 |

caagtagatg ctaaagtgat agaaaaggta gagttttatt ctgacaatgg tagattaact 2280
aatactaaca atgaaaactt atttgttcgt tatgatttag ttcgtaaaag tcaaaaatgg 2340
caaattagta attggaaggt attgagataa 2370

<210> 194
<211> 789
<212> PRT
<213> Trichodesmium erythraeum

<400> 194

Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Ile Gln
1 5 10 15

Ala Thr Ala Glu Gln Leu Arg Gln Ala His Gln Asp Arg Thr Gln Gln
20 25 30

Phe Pro Arg Arg Glu Tyr Ser Glu Ala Thr Ile Val Ala Arg Lys Gln
35 40 45

Leu Ile Asp Glu Ala Tyr Ala Val Leu Cys Asp Pro Glu Gln Arg Gln
50 55 60

Thr Tyr Asp Gly Asn Phe Leu Ala Lys Thr Tyr Glu Pro Ile Val Glu
65 70 75 80

Glu Leu Asn Pro Ser Ser Gln Ile Asn Phe Asp Gln Ala Gln Glu Lys
85 90 95

Glu Thr Thr Leu Lys Glu Thr Arg Glu Val Leu Pro Glu Ile Ala Ser
100 105 110

Lys Gln Leu Lys Lys Arg Thr Ser Tyr Gln Asn Arg Glu Thr Lys Ala
115 120 125

Ala Ser Asp Phe His Ser Asn Thr Pro Ser Ile Glu Ile Glu Tyr Pro
130 135 140

Gln Phe Val Gly Ala Ile Leu Ile Leu His Glu Leu Gly Glu Tyr Glu
145 150 155 160

Leu Val Leu Lys Ile Thr His Pro Tyr Leu Leu Asn Asn Ser Ile Thr
165 170 175

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Lys | Asp | Gly | Arg | Phe | Gly | Asp | Pro | Ala | Leu | Val | Leu | Pro | Asp | Val | 180 | 185 | 190 | |
| Val | Leu | Thr | Val | Ala | Leu | Ala | Asn | Leu | Glu | Leu | Gly | Arg | Glu | Glu | Trp | 195 | 200 | 205 | |
| Gln | Gln | Gly | Gln | Tyr | Glu | Ser | Ala | Ala | Thr | Ala | Leu | Glu | Ala | Gly | Leu | 210 | 215 | 220 | |
| Gly | Leu | Leu | Leu | Arg | Glu | Asn | Leu | Phe | Val | Gln | Ile | Arg | Gly | Glu | Ile | 225 | 230 | 235 | 240 |
| Gln | Ala | Asp | Leu | Tyr | Lys | Leu | Arg | Pro | Tyr | Arg | Ile | Met | Glu | Leu | Ile | 245 | 250 | 255 | |
| Ala | Leu | Pro | Glu | Glu | Ile | Ala | Leu | Asp | Arg | Ser | Arg | Gly | Leu | Glu | Ile | 260 | 265 | 270 | |
| Leu | Gln | Asp | Met | Leu | Asn | Glu | Arg | Gly | Gly | Ile | Asp | Gly | Gln | Gly | Glu | 275 | 280 | 285 | |
| Asp | Ser | Ser | Gly | Leu | Gly | Ile | Glu | Asp | Phe | Leu | Lys | Phe | Val | Gln | Gln | 290 | 295 | 300 | |
| Leu | Arg | Gln | Tyr | Leu | Thr | Thr | Ala | Glu | Gln | Lys | Lys | Leu | Phe | Glu | Ala | 305 | 310 | 315 | 320 |
| Glu | Ala | Leu | Arg | Pro | Ser | Ala | Val | Gly | Ala | Tyr | Leu | Ala | Val | Tyr | Thr | 325 | 330 | 335 | |
| Phe | Leu | Ala | Gln | Gly | Phe | Ala | Gln | Lys | Gln | Pro | Ala | Phe | Ile | Arg | Lys | 340 | 345 | 350 | |
| Ala | Lys | Leu | Met | Leu | Met | Gln | Leu | Gly | Arg | Ser | Gln | Asp | Val | Asn | Leu | 355 | 360 | 365 | |
| Glu | Lys | Ser | Val | Cys | Ala | Leu | Leu | Leu | Gly | Gln | Thr | Glu | Glu | Ala | Ser | 370 | 375 | 380 | |
| Arg | Ser | Leu | Glu | Leu | Ser | His | Glu | Asn | Glu | Pro | Leu | Ser | Phe | Ile | Lys | 385 | 390 | 395 | 400 |
| Glu | Asn | Ser | Gln | Gln | Ser | Pro | Asp | Leu | Leu | Pro | Gly | Leu | Cys | Leu | Tyr | 405 | 410 | 415 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Glu | His | Trp | Leu | Thr | Glu | Glu | Val | Phe | Pro | His | Phe | Arg | Asp | Leu |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Ser | Asp | Lys | Ser | Ala | Ser | Leu | Lys | Asp | Tyr | Phe | Ala | Asp | Gln | His | Val |
| | | 435 | | | | | 440 | | | | | 445 | | | |
| Gln | Ala | Tyr | Leu | Glu | Ala | Leu | Pro | Thr | Glu | Ala | Glu | Val | Ala | Asn | Gln |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Trp | Val | Val | Val | Gln | Pro | Arg | Arg | Ser | Asn | His | Asn | Lys | Lys | Gln | Met |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Phe | Asp | Pro | Lys | Glu | Leu | Glu | Lys | Leu | Asn | Val | Ser | Asp | Leu | Glu | Asp |
| | | | 485 | | | | | | 490 | | | | | 495 | |
| Lys | Asp | Ile | Ser | Arg | Val | Asp | Ala | Thr | Ala | Thr | Gly | Ile | Val | Ala | Ser |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Gly | Ser | Gln | Gly | Ser | Ser | Asn | Leu | Leu | Gly | Ala | Ser | Ser | Asp | Gly | Leu |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Leu | Gln | Glu | Leu | Glu | Lys | Ser | Ser | Ser | Thr | Arg | Gly | Gly | Pro | Lys | Gln |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Val | Thr | Thr | Lys | Ser | Ser | Ser | His | Tyr | Leu | Gly | Lys | Ile | Arg | Glu | Lys |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Ser | Ile | Ser | Gly | Leu | Pro | Glu | Phe | Asn | Glu | Ser | Thr | Ser | Ile | Glu | Ser |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Gly | Gly | Leu | Pro | Gln | Ser | Ile | Gln | Glu | His | Ser | Ser | Arg | Arg | Thr | Ser |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Ala | Arg | Arg | Glu | Pro | Val | Lys | Phe | Gly | Arg | Leu | Ile | Leu | Ile | Ala | Ile |
| | | | 595 | | | | 600 | | | | | 605 | | | |
| Val | Gly | Phe | Leu | Leu | Ile | Gly | Phe | Ile | Gly | Leu | Leu | Thr | Ile | Lys | Thr |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Ile | Gly | Trp | Leu | Val | Asn | Ala | Leu | Gly | Trp | Glu | Arg | Glu | Lys | Leu | Met |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |

Ile Gln Leu Asp Arg Pro Pro Ile Glu Ile Pro Glu Pro Asp Arg Val
645 650 655

Asn Leu Ala Ala Ser Gly Pro Ile Thr Lys Glu Val Ala Arg Arg Thr
660 665 670

Ile Gln Ser Trp Leu Asp Ile Lys Ala Ser Ala Leu Gly Pro Asn His
675 680 685

Lys Ile Glu Gln Leu Pro Asn Ile Leu Val Glu Pro Ala Leu Ser Arg
690 695 700

Trp Leu Pro Thr Ala Asn Ala Leu Lys Gln Glu Lys Ser Tyr Arg Arg
705 710 715 720

Tyr Glu His Asp Leu Glu Ile Ser Asn Ile Lys Met Ser Asn Thr Asn
725 730 735

Ser Asn Leu Ala Gln Val Asp Ala Lys Val Ile Glu Lys Val Glu Phe
740 745 750

Tyr Ser Asp Asn Gly Arg Leu Thr Asn Thr Asn Asn Glu Asn Leu Phe
755 760 765

Val Arg Tyr Asp Leu Val Arg Lys Ser Gln Lys Trp Gln Ile Ser Asn
770 775 780

Trp Lys Val Leu Arg
785

<210> 195
<211> 765
<212> PRT
<213> Homo sapiens

<400> 195

Met Gly Asn Arg Gly Met Glu Asp Leu Ile Pro Leu Val Asn Arg Leu
1 5 10 15

Gln Asp Ala Phe Ser Ala Ile Gly Gln Asn Ala Asp Leu Asp Leu Pro
20 25 30

Gln Ile Ala Val Val Gly Gly Gln Ser Ala Gly Lys Ser Ser Val Leu
35 40 45

Glu Asn Phe Val Gly Arg Val Thr Arg Arg Pro Leu Val Leu Gln Leu
 50 55 60

Val Asn Ala Thr Thr Glu Tyr Ala Glu Phe Leu His Cys Lys Gly Lys
 65 70 75 80

Lys Phe Thr Glu Ala Glu Thr Asp Arg Val Thr Gly Thr Asn Lys Gly
 85 90 95

Ile Ser Pro Val Pro Ile Asn Leu Arg Val Tyr Ser Pro His Val Leu
 100 105 110

Asn Leu Thr Leu Val Asp Leu Pro Gly Met Thr Lys Val Pro Val Gly
 115 120 125

Asp Gln Pro Pro Asp Ile Glu Phe Gln Ile Arg Asp Met Leu Met Gln
 130 135 140

Phe Val Thr Lys Glu Asn Cys Ser Asp Leu Ala Asn Ser Asp Ala Leu
 145 150 155 160

Lys Val Ala Lys Glu Val Asp Pro Gln Gly Gln Arg Thr Ile Gly Val
 165 170 175

Ile Thr Lys Leu Asp Leu Met Asp Glu Gly Thr Asp Ala Arg Asp Val
 180 185 190

Leu Glu Asn Lys Leu Leu Pro Leu Arg Arg Gly Tyr Ile Gly Val Val
 195 200 205

Asn Arg Ser Gln Lys Asp Ile Asp Gly Lys Lys Asp Ile Thr Phe Leu
 210 215 220

Ser His Pro Ser Tyr Arg His Leu Ala Asp Arg Met Gly Thr Pro Tyr
 225 230 235 240

Leu Gln Lys Val Leu Asn Gln Gln Leu Thr Asn His Ile Arg Asp Thr
 245 250 255

Leu Pro Gly Leu Arg Asn Lys Leu Gln Ser Gln Leu Leu Ser Ile Glu
 260 265 270

Lys Glu Val Glu Glu Tyr Lys Asn Phe Arg Pro Asp Asp Pro Ala Arg
 275 280 285

Lys Thr Lys Ala Leu Asp Phe Glu Lys Arg Ile Glu Gly Ser Gly Asp
 290 295 300

Gln Ile Asp Thr Tyr Glu Leu Ser Gly Gly Ala Arg Ile Asn Arg Ile
 305 310 315 320

Phe His Glu Arg Phe Pro Phe Glu Leu Val Lys Met Glu Phe Asp Glu
 325 330 335

Lys Glu Leu Arg Arg Glu Ile Ser Tyr Ala Ile Lys Asn Ile His Gly
 340 345 350

Ile Arg Thr Gly Leu Phe Thr Pro Asp Met Ala Lys Lys Ile Arg Glu
 355 360 365

Pro Cys Leu Lys Cys Val Asp Met Val Ile Ser Glu Leu Ile Ser Thr
 370 375 380

Val Arg Gln Cys Thr Lys Lys Leu Gln Gln Tyr Pro Arg Leu Arg Glu
 385 390 395 400

Glu Met Glu Arg Ile Val Thr Thr His Ile Arg Glu Arg Glu Gly Arg
 405 410 415

Thr Lys Glu Gln Val Met Met Asn Thr Asn His Glu Asp Phe Ile Gly
 420 425 430

Phe Ala Asn Ala Gln Gln Arg Ser Asn Gln Met Asn Lys Lys Lys Thr
 435 440 445

Ser Gly Asn Gln Asp Glu Ile Leu Val Ile Arg Lys Gly Trp Leu Thr
 450 455 460

Ile Asn Asn Ile Gly Ile Met Lys Gly Gly Ser Lys Glu Tyr Trp Phe
 465 470 475 480

Val Leu Thr Ala Glu Asn Leu Ser Trp Tyr Lys Asp Asp Ser Val Asp
 485 490 495

Asn Leu Lys Leu Arg Asp Val Glu Lys Gly Phe Met Ser Ser Lys His
500 505 510

Ile Phe Ala Leu Phe Asn Thr Glu Gln Arg Asn Val Tyr Lys Asp Tyr
515 520 525

Arg Gln Leu Glu Leu Ala Cys Glu Thr Gln Glu Glu Val Asp Ser Trp
530 535 540

Lys Ala Ser Phe Leu Arg Ala Gly Val Tyr Pro Glu Arg Val Gly Asp
545 550 555 560

Lys Glu Lys Asp Ser Phe Met His Ser Met Asp Pro Gln Leu Glu Arg
565 570 575

Gln Val Glu Thr Ile Arg Asn Leu Val Asp Ser Tyr Met Ala Ile Val
580 585 590

Asn Lys Thr Val Arg Asp Leu Met Pro Lys Thr Ile Met His Leu Met
595 600 605

Ile Asn Asn Thr Lys Glu Phe Ile Phe Ser Glu Leu Leu Ala Asn Leu
610 615 620

Tyr Ser Cys Gly Asp Gln Asn Thr Leu Met Arg Asp Glu Met Leu Arg
625 630 635 640

Met Tyr His Ala Leu Lys Glu Ala Leu Ser Ile Ile Gly Asn Ile Asn
645 650 655

Thr Thr Thr Val Ser Thr Pro Met Pro Pro Pro Val Asp Asp Ser Trp
660 665 670

Leu Gln Val Gln Ser Val Pro Ala Gly Arg Arg Ser Pro Thr Ser Ser
675 680 685

Pro Thr Pro Gln Arg Arg Ala Pro Ala Val Pro Pro Ala Arg Pro Gly
690 695 700

Ser Ala Gly Ser Ala Leu Gly Gly Ala Pro Pro Val Pro Ser Arg Pro
705 710 715 720

Gly Ala Ser Pro Asp Pro Phe Gly Pro Pro Pro Gln Val Pro Ser Arg
725 730 735

Pro Asn Arg Ala Pro Pro Gly Val Pro Ser Arg Ser Gly Gln Ala Ser
740 745 750

Pro Ser Arg Pro Glu Ser Pro Arg Pro Pro Phe Asp Leu
755 760 765

<210> 196
<211> 670
<212> PRT
<213> *Saccharomyces cerevisiae*

<400> 196

Met Ala Ser Leu Glu Asp Leu Ile Pro Thr Val Asn Lys Leu Gln Asp
1 5 10 15

Val Met Tyr Asp Ser Gly Ile Asp Thr Leu Asp Leu Pro Ile Leu Ala
20 25 30

Val Val Gly Ser Gln Ser Ser Gly Lys Ser Ser Ile Leu Glu Thr Leu
35 40 45

Val Gly Arg Val Thr Arg Arg Pro Leu Val Leu Gln Leu Asn Asn Ile
50 55 60

Ser Pro Asn Ser Pro Leu Ile Glu Glu Asp Asp Asn Ser Val Asn Pro
65 70 75 80

His Asp Glu Val Thr Lys Ile Ser Gly Phe Glu Ala Gly Thr Lys Pro
85 90 95

Leu Glu Tyr Arg Gly Lys Glu Arg Asn His Ala Asp Glu Trp Gly Glu
100 105 110

Phe Leu His Ile Pro Gly Lys Arg Phe Tyr Glu Asn Glu Thr Ala Arg
115 120 125

Ile Ala Gly Lys Asp Lys Gly Ile Ser Lys Ile Pro Ile Asn Leu Lys
130 135 140

Val Phe Ser Pro His Val Leu Asn Leu Thr Leu Val Asp Leu Pro Gly
145 150 155 160

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Thr | Lys | Val | Pro | Ile | Gly | Glu | Gln | Pro | Pro | Asp | Ile | Glu | Lys | Gln | 165 | 170 | 175 | |
| Ile | Lys | Asn | Leu | Ile | Leu | Asp | Tyr | Ile | Ala | Thr | Pro | Asn | Cys | Val | Asp | 180 | 185 | 190 | |
| Leu | Val | Asn | Ser | Glu | Ser | Leu | Lys | Leu | Ala | Arg | Glu | Val | Asp | Pro | Gln | 195 | 200 | 205 | |
| Gly | Lys | Arg | Thr | Ile | Gly | Val | Ile | Thr | Lys | Leu | Asp | Leu | Met | Asp | Ser | 210 | 215 | 220 | |
| Gly | Thr | Asn | Ala | Leu | Asp | Ile | Leu | Ser | Gly | Lys | Met | Tyr | Pro | Leu | Lys | 225 | 230 | 235 | 240 |
| Leu | Gly | Phe | Val | Gly | Val | Val | Asn | Arg | Ser | Gln | Gln | Asp | Ile | Gln | Leu | 245 | 250 | 255 | |
| Asn | Lys | Thr | Val | Glu | Phe | Arg | Lys | His | Pro | Val | Tyr | Arg | Thr | Ile | Ser | 260 | 265 | 270 | |
| Thr | Lys | Cys | Gly | Thr | Arg | Tyr | Leu | Ala | Lys | Leu | Leu | Asn | Gln | Thr | Leu | 275 | 280 | 285 | |
| Leu | Ser | His | Ile | Arg | Asp | Lys | Leu | Pro | Asp | Ile | Lys | Thr | Lys | Leu | Asn | 290 | 295 | 300 | |
| Thr | Leu | Ile | Ser | Gln | Thr | Glu | Gln | Glu | Leu | Ala | Arg | Tyr | Gly | Gly | Val | 305 | 310 | 315 | 320 |
| Gly | Ala | Thr | Thr | Asn | Glu | Ser | Arg | Ala | Ser | Leu | Val | Asn | Phe | Ile | Ser | 325 | 330 | 335 | |
| Ser | Ile | Asp | Gly | Thr | Ser | Ser | Asp | Ile | Asn | Thr | Lys | Glu | Leu | Cys | Gly | 340 | 345 | 350 | |
| Gly | Ala | Arg | Ile | Tyr | Tyr | Ile | Tyr | Asn | Asn | Val | Phe | Gly | Asn | Ser | Leu | 355 | 360 | 365 | |

Lys Ser Ile Asp Pro Thr Ser Asn Leu Ser Val Leu Asp Val Arg Thr
 370 375 380
 Ala Ile Arg Asn Ser Thr Gly Pro Arg Pro Thr Leu Phe Val Pro Glu
 385 390 395 400
 Leu Ala Lys Leu Leu Leu Glu Pro Ser Gln Arg Cys Val Glu Leu Val
 405 410 415
 Tyr Glu Glu Leu Met Lys Ile Cys His Lys Cys Gly Ser Ala Glu Leu
 420 425 430
 Ala Arg Tyr Pro Lys Leu Lys Ser Met Leu Ile Glu Val Ile Ser Glu
 435 440 445
 Leu Leu Arg Glu Arg Leu Gln Pro Thr Arg Ser Tyr Val Glu Ile Asn
 450 455 460
 Thr Asn His Pro Asn Phe Leu Ser Ala Thr Glu Ala Met Asp Asp Ile
 465 470 475 480
 Met Lys Thr Arg Arg Lys Arg Asn Gln Glu Leu Leu Lys Ser Lys Leu
 485 490 495
 Ser Gln Gln Glu Asn Gly Gln Thr Asn Gly Ile Asn Gly Thr Ser Ser
 500 505 510
 Ile Ser Ser Asn Ile Asp Gln Asp Asp Gly Ile Asp Ala Glu Ser Lys
 515 520 525
 Gln Thr Lys Asp Lys Phe Leu Asn Tyr Phe Phe Gly Lys Asp Lys Lys
 530 535 540
 Gly Gln Pro Val Phe Asp Ala Ser Asp Lys Lys Arg Ser Ile Ala Gly
 545 550 555 560
 Asp Gly Asn Ile Glu Asp Phe Arg Asn Leu Gln Ile Ser Asp Phe Ser
 565 570 575
 Leu Gly Asp Ile Asp Asp Pro Leu Thr Glu Arg Glu Glu Leu Glu Cys
 580 585 590

Glu Leu Ile Lys Arg Leu Ile Val Ser Tyr Phe Asp Ile Ile Arg Glu
595 600 605

Met Ile Glu Asp Gln Val Pro Lys Ala Val Met Cys Leu Leu Val Asn
610 615 620

Tyr Cys Lys Asp Ser Val Gln Asn Arg Leu Val Thr Lys Leu Tyr Lys
625 630 635 640

Glu Thr Leu Phe Glu Glu Leu Leu Arg Glu Leu Cys Val Lys Ser Leu
645 650 655

Gly Val Tyr Lys Lys Ala Ala Thr Leu Ile Ser Asn Ile Leu
660 665 670

<210> 197
<211> 690
<212> PRT
<213> Arabidopsis thaliana

<400> 197

Met Ala Glu Val Ser Ala Lys Ser Val Thr Val Glu Glu Met Ala Glu
1 5 10 15

Glu Asp Asp Ala Ala Ile Glu Glu Arg Trp Ser Leu Tyr Glu Ala Tyr
20 25 30

Asn Glu Leu His Ala Leu Ala Gln Glu Leu Glu Thr Pro Phe Glu Ala
35 40 45

Pro Ala Val Leu Val Val Gly Gln Gln Thr Asp Gly Lys Ser Ala Leu
50 55 60

Val Glu Ala Leu Met Gly Phe Lys Thr Arg Arg Pro Ile Thr Leu His
65 70 75 80

Met Lys Tyr Asp Pro Gln Cys Gln Phe Pro Leu Cys His Leu Gly Ser
85 90 95

Asp Asp Asp Pro Ser Val Ser Leu Pro Lys Glu Ala Glu Asn Met Arg
100 105 110

Leu Glu Gln Glu Pro Cys Ser Pro Phe Ser Ala Lys Glu Ile Ile Val
115 120 125

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Val | Gln | Tyr | Lys | Tyr | Cys | Pro | Asn | Leu | Thr | Ile | Ile | Asp | Thr | Pro | 130 | 135 | 140 |
| Gly | Leu | Ile | Ala | Pro | Ala | Pro | Gly | Leu | Lys | Asn | Arg | Ala | Leu | Gln | Val | 145 | 150 | 155 |
| Gln | Ala | Arg | Ala | Val | Glu | Ala | Leu | Val | Arg | Ala | Lys | Met | Gln | His | Lys | 165 | 170 | 175 |
| Glu | Ser | Asp | Trp | Ser | Ile | Ala | Thr | Thr | Arg | Arg | Ile | Val | Met | Gln | Val | 180 | 185 | 190 |
| Asp | Pro | Glu | Leu | Ser | Arg | Thr | Ile | Val | Val | Ser | Thr | Lys | Leu | Asp | Thr | 195 | 200 | 205 |
| Lys | Ile | Pro | Gln | Phe | Ser | Cys | Ser | Ser | Asp | Val | Glu | Val | Phe | Leu | Ser | 210 | 215 | 220 |
| Pro | Pro | Ala | Ser | Ala | Leu | Asp | Ser | Ser | Leu | Leu | Gly | Asp | Ser | Pro | Phe | 225 | 230 | 235 |
| Phe | Tyr | Gly | Gln | Asp | Ser | Val | Tyr | Lys | Ser | Asn | Asp | Glu | Phe | Lys | Gln | 245 | 250 | 255 |
| Ala | Val | Ser | Leu | Arg | Glu | Met | Glu | Asp | Ile | Ala | Ser | Leu | Glu | Lys | Lys | 260 | 265 | 270 |
| Leu | Gly | Arg | Leu | Leu | Thr | Lys | Gln | Glu | Lys | Ser | Arg | Ile | Gly | Ile | Ser | 275 | 280 | 285 |
| Lys | Leu | Arg | Leu | Phe | Leu | Glu | Glu | Leu | Leu | Trp | Lys | Arg | Tyr | Lys | Glu | 290 | 295 | 300 |
| Ser | Val | Pro | Leu | Ile | Ile | Pro | Leu | Arg | Lys | Leu | Asp | Thr | Val | Ser | Lys | 305 | 310 | 315 |
| Glu | Leu | Ser | Ser | Leu | Asp | Glu | Ala | Lys | Leu | Lys | Glu | Arg | Gly | Arg | Thr | 325 | 330 | 335 |
| Phe | His | Asp | Leu | Phe | Leu | Thr | Lys | Leu | Ser | Leu | Leu | Leu | Lys | Gly | Thr | 340 | 345 | 350 |

Val Val Ala Pro Pro Asp Lys Phe Gly Glu Thr Leu Gln Asp Glu Arg
 355 360 365

Thr Gln Gly Gly Ala Phe Val Gly Thr Asp Gly Leu Gln Phe Ser Arg
 370 375 380

Leu Tyr Gly Gly Ala Gln Tyr His Arg Ala Met Ala Glu Phe Arg Phe
 385 390 395 400

Leu Val Gly Ala Ile Lys Cys Pro Pro Ile Thr Arg Glu Glu Ile Val
 405 410 415

Asn Ala Cys Gly Val Glu Asp Ile His Asp Gly Thr Asn Tyr Ser Arg
 420 425 430

Thr Ala Cys Val Ile Ala Val Ala Lys Ala Arg Glu Thr Phe Glu Pro
 435 440 445

Phe Leu His Gln Leu Gly Leu Leu Pro Ile Ser Val Tyr Leu Leu Gln
 450 455 460

Lys Glu Gly Glu Tyr Leu Ser Gly His Glu Val Phe Leu Lys Arg Val
 465 470 475 480

Ala Ser Ala Phe Asn Ser Phe Val Glu Ser Thr Glu Lys Ser Cys Arg
 485 490 495

Asp Lys Cys Met Glu Asp Leu Ala Ser Thr Thr Arg Tyr Val Thr Trp
 500 505 510

Ser Leu His Asn Lys Asn Ser Phe Gly Gly Thr Glu His Asn Thr Thr
 515 520 525

Ser Gly Asn Ala Ile Gly Phe Ser Leu Pro Gln Asp Ala Leu Gly Gly
 530 535 540

Thr Thr Asp Thr Lys Ser Arg Ser Asp Val Lys Leu Ser His Leu Ala
 545 550 555 560

Ser Asn Ile Asp Ser Gly Ser Ser Ile Gln Thr Thr Glu Met Arg Leu
 565 570 575

Ala Asp Leu Leu Asp Ser Thr Leu Trp Asn Arg Lys Leu Ile Val Tyr
580 585 590

Ala Leu Val Gln Gln Ile Phe Gln Gly Ile Arg Glu Tyr Phe Leu Ala
595 600 605

Ser Ala Glu Leu Lys Phe Asn Cys Phe Leu Leu Met Pro Ile Val Asp
610 615 620

Lys Leu Pro Ala Leu Leu Arg Glu Glu Leu Glu Asn Ala Phe Glu Asp
625 630 635 640

Asp Leu Asp Ser Ile Phe Asp Ile Thr Asn Leu Arg Thr Glu Ile Glu
645 650 655

Leu Arg Arg Val Lys Arg Ile Lys Glu Lys Phe Arg Val Met Asn Glu
660 665 670

Lys Leu Asn Ser His Glu Phe Ala Gln Asn Leu Lys Ala Pro Ser Val
675 680 685

Gln His
690

<210> 198
<211> 712
<212> DNA
<213> Lactuca sativa

<220>
<221> misc_feature
<222> (608)..(608)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (656)..(656)
<223> n is a, c, g, or t

<400> 198
ttgttcagct ccgccaaaag aatccaagaa ttggcgtaat ccggctcgat tcttattgtg 60
aagggaccag gtgacataac ggggtggtgct tattagatct tccatgcatt tttcatggca 120
tgatctttcg gtggattcag caaagttata gaaagcagat gaaacacgtc tcaagaaaac 180
ttcatggcca cttaggaatt cgccttcttt ctgaagaaga taaacggaga tgggaagtaa 240

| | |
|--|-----|
| tctcttgaga atgtgaagaa gtcgactgcc caactgatga agaaaagggtt caaaagtatc | 300 |
| acgagctttt gcaacagcga tgacacatgc agtcctggag taatttggtc catcatgaat | 360 |
| atcttcgacc ccacatgcat tcacaatttc ttcacgtgta attgcagggc attttatccc | 420 |
| tccaacaaca aacctaaatt cagccatggc acgatgatat tgtgcacctc catatagacg | 480 |
| catacctgca ttaggtatta gtttgtgtgg gaactgagag ccatcaatac cgattaatgc | 540 |
| ccctccatta accctctcat cttgtagtgt ttccccaaat ttatctggag gtgcaacaac | 600 |
| tgtccctntt catagcagtg ataacttggg aaggaaaaga tcatgaaaag atctcncttt | 660 |
| ctcctttagt ttgacttcat ctaaagtgt gagttcttga tttatgtcat tt | 712 |

<210> 199
 <211> 666
 <212> DNA
 <213> *Medicago truncatula*

<220>
 <221> misc_feature
 <222> (646)..(646)
 <223> n is a, c, g, or t

| | |
|--|-----|
| <400> 199 | |
| atctaaagta acaaccacca caaaacacaa caatggagga agaaagagaa caccaccaac | 60 |
| tcaaagacaa agaagaaaac gagtggcgtc tctacgaagc ttacaatgaa cttcacgcgc | 120 |
| ttgctcaaga acttcacacg cctttcgacg cgccggcggt actggttgtg ggccaccaa | 180 |
| cagacgggaa gagcgctta gttgaggctc taatgggctt ccagttcaac cacgtcgggtg | 240 |
| gtggcaccaa aaccgcgcg cccattactc ttcacatgaa atatggccca cattgcgagt | 300 |
| ctccttcttg ctatcttctt tctgatgatg acccttctct ttctcaccat atgtcacttt | 360 |
| cccaaatacca gggttatatt gaagctgaga atgcgaggtt ggagcgtgac tcatgttgtc | 420 |
| aattttcagc taaggaaata atcataaaag tggaatacaa atactgtccc aatctcacca | 480 |
| taatagacac accaggatta gttgctcctg caccaggctg taaaaatagg gcgatacagg | 540 |
| cacaggcacg agcggtagag tcaactcggtc gtgcaaaaat gcagcacaag gagttcatta | 600 |
| tactctgtct tgaagattgt agtgattgga gcaatgcgac tacgangcgc gttgtaatgc | 660 |
| aaattg | 666 |

<210> 200
 <211> 663
 <212> DNA
 <213> *Medicago truncatula*

<400> 200
 gtctttatgg gggcgcacaa tatcatcgag caatggctga atttcgtttt gtagttggag 60
 gaatcaagtg ccctccaatt acccggaag aaattgtaaa tgcttggtga gttgaagaca 120
 ttcattgatg aacaaactac tctaggactg cttgtgtaat tgctgttgca aaggctcatg 180
 atacatttga acctttttctt catcagttgg ggtctagatt gttgcacata ctttaagagat 240
 tgctcccaat ctctttttat cttcttcaga aagattgtga gtatctaagt ggccatcagg 300
 tgctcctcag gcgtgttgcc tccgccttcg acaactttgc agaatccact gaaaaatcat 360
 gccgtgaaaa atgtatggag gacttggtta gcaccacacg atatgtctca tggctctctac 420
 acaataagag tcgggcagga ttacgccagt tcttagattc atttggtgga acagaacatt 480
 ccaatgtttg taatgatccc actgcaactg ttctatcaca aacaaatgtg caagagaagg 540
 aagacacaaa gccacaacta gaagtaaagc tcagtcacgt ggcctctgga actgataccta 600
 gcacatccac ccagacagct gaaacaaagc ttgctgacct tcttgatagt acactttgga 660
 atc 663

<210> 201
 <211> 622
 <212> DNA
 <213> *Prunus persica*

<220>
 <221> misc_feature
 <222> (609)..(609)
 <223> n is a, c, g, or t

<400> 201
 gcttatacct aacgcaggaa tgcgtttata tgggtggtgca caataccacc gtgccatggc 60
 tgagttccgc tttgtagttg gaggaataaa atgccctcca attacaaggg aagaaattgt 120
 aaatgcatgt ggagttgaag atttacatga tggcacaac tactcaagga cagcttgtgt 180
 aatagccgtt gcaaaggccc gtgatacatt tgagcctttc cttcatcagt taggtttag 240
 actcttgac attctaaaga gattacttcc tatatcagtc tatcttcttc agaaagatgg 300
 tgagtattta agtggccatg aggtgtttct taggcgtgtt gcttctgctt tcaatgactt 360
 tgcagaatct accgaaaggg catgtcgtga aaaatgcatg gaggatttag taagcaccac 420

| | |
|---|-----|
| ccgctatgtc acctgggtccc ttcacaacaa gaatcgagct gggttacgtc aattttttaga | 480 |
| ctcgttcgct ggaacagAAC ataacactat gggtagtaat tgcgtacctg ctgggtatttc | 540 |
| ccaagattca tcctttgggt ctgttgccaa tgagaaggat actaagtcaa gggcagatgt | 600 |
| gaagctcanc catgtggcgt ct | 622 |

<210> 202
 <211> 752
 <212> DNA
 <213> Solanum tuberosum

| | |
|--|-----|
| <400> 202 | |
| gcgaatgtga ttcttcaaag gcaacaaagg ctgacggagg aatttgtgcc tcgtgcagat | 60 |
| ctgcttctgt ttctcatgtc tgctgatcga ccattaactg aaagtgaggt tagttttctg | 120 |
| cgttacactc agcagtggag taagaaggtc atttttgtgc tgaacaagtc tgacatatac | 180 |
| aagaataacg gcgagttgga ggaggccatt gcatttatca aagaaaatac acggaaattg | 240 |
| ctgaatacag aatccgtaac actgtatcca gtatctgcac ggctcgctct tgaatcaaag | 300 |
| ctttctactt ttgatgggtgc ccttagtcaa aacaatggga gttcaaataa tgattctcac | 360 |
| tggaaaacca agagcttcta tgagcttgag aagtacttgt ctagcttttt ggattcatcc | 420 |
| acaagtactg gaattgagag aatgaagctg aagcttgaaa ctccaattgc cattgcagaa | 480 |
| caactacttt tagcttgtca aggacttgtg agacaagaat gtcagcaagc caaacaagac | 540 |
| ttgctgtttg ttgaggatct tgtcaacagc gtagaagagt gcacaaagaa gctggaagtt | 600 |
| gatagcattc tgtggaagag gcaggttcta tctctgataa actctgctca agcacgtgtt | 660 |
| gtccggcttg tagagtcaac gttacaactg tcaaatgttg atcttgtcgc tacatatgta | 720 |
| ttcagaagag aaaactctac tcaaatgccA gc | 752 |

<210> 203
 <211> 492
 <212> DNA
 <213> Glycine max

| | |
|---|-----|
| <400> 203 | |
| tgttgaatga agctattgaa gctatcaaga gggctgcacc tctgatggag gaggtttcac | 60 |
| ttcttaatga tgcggtttct caaattgatg agccattctt actgggtata gtgggggaat | 120 |
| tcaactctgg taaatctacc gtgattaatg cgcttcttgg agaaagatat ctcaaagagg | 180 |
| gagttgttcc aacaactaat gagatcacat ttttacgata tactgactta gatattgaac | 240 |
| aacaacggtg tgaaaggcat ccagatggcc aatatatttg ctacattcct gctccaattc | 300 |

| | |
|---|-----|
| ttaaagagat gaccattggt gatacacctg gaactaatgt gattcttcag aggcagcagc | 360 |
| gtcttacaga ggaatttgta ccccggtgcag atttacttct ttttgtcatt tctgctgac | 420 |
| gccctttaac tgggaagtgc attgcttttc ttcgttattc tcagcagtgg aaaaagaaag | 480 |
| cggctcttct ct | 492 |

<210> 204
 <211> 446
 <212> DNA
 <213> *Lycopersicon esculentum*

| | |
|--|-----|
| <400> 204 | |
| gagaccatta agtacaattc tataagcagt cttttgaaaa aagatggact tcattggtga | 60 |
| atccgtctga ccaaattgag ttaggaacaa ctgggtgtgct ggatagaaaa tctgaagtta | 120 |
| ccataagtgt catagaggat ttcagtgtgc cagctgcttc aaaattgctt gagagagata | 180 |
| ttcgtgaagt gttcttgggt acttttggtg gtcttggagc agctgggtta tcagcgtcgc | 240 |
| ttctgacatc tgttcttcaa accacattag aagacctcct tgcacttggc ctttgttctg | 300 |
| ctggcggggt attagcggtc ttcaacttct catcccgag acagcaagtg gtagataaag | 360 |
| taaagaggac tgctgatggc ctttcacgtg aactcgaaga ggctatgcag aaggagctct | 420 |
| tggagacgac tagtaatgtg gaggac | 446 |

<210> 205
 <211> 521
 <212> DNA
 <213> *Populus balsamifera* subsp. *trichocarpa*

| | |
|--|-----|
| <400> 205 | |
| tggtgttgtg ctgtctgac aagggcttcc tgcccttgtg gcaagaaata tgatgatggg | 60 |
| ttctcgaact gaatcagttg ttctaccttt ggtagccagg attgtgcaga caccatatgc | 120 |
| tgcattaaat gcgtctaatt ctgaagggtgc tgattttctt atatatgttc atggcccaga | 180 |
| ggatgatcct gatgtagaaa tgagccctgg attcgggaat gtgaagatac caatcttctg | 240 |
| cctcaatgct tcacgtgggg aggacacatt gtcgggtgggg gcatcaaaat ttctgaaaac | 300 |
| cggtgctagt ggtttagtgc tgcattgga agatttgagg ttatttagcg atgatgcttt | 360 |
| gagtcagatg ttgacactc tgagtgcac cggtaaaaac tttcaggatg accttgaaag | 420 |
| cttcagtaag ctcaaatcta tggatatgga aaatgatatt catgaaaaaa caacggtggc | 480 |
| aggctttgtt aaactggagg atagagaaaa acagctcata g | 521 |

<210> 206
 <211> 324
 <212> PRT
 <213> Arabidopsis thaliana

<400> 206

Met Glu Ala Leu Ser His Val Gly Ile Gly Leu Ser Pro Phe Gln Leu
 1 5 10 15

Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His Asn Thr
 20 25 30

Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
 35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
 50 55 60

Thr Thr Thr Ala Thr Leu Val Ser Leu Pro Pro Ser Ile Asp Arg Pro
 65 70 75 80

Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
 85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
 100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
 115 120 125

Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn Pro Arg
 130 135 140

Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu Ala Thr
 145 150 155 160

Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu Cys Val
 165 170 175

Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly Glu Ala
 180 185 190

Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val Val Leu
 195 200 205

Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met Ala Leu
 210 215 220

Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu Ala Leu
 225 230 235 240

Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp Leu Arg
 245 250 255

Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr Val Leu
 260 265 270

Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys Arg Leu
 275 280 285

Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly Gly Gly
 290 295 300

Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe Met Asn
 305 310 315 320

Glu Ala Phe Leu

<210> 207
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<220>
 <221> misc_feature
 <222> (2)..(3)
 <223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (5)..(5)
 <223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (7)..(7)
 <223> Xaa can be any naturally occurring amino acid

<400> 207

Cys Xaa Xaa Cys Xaa Gly Xaa Gly
1 5

<210> 208

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic

<220>

<221> CDS

<222> (1)..(21)

<400> 208

gcg ttt tta tga atg aca gct
Ala Phe Leu Met Thr Ala
1 5

21